UNIVERSITY OF MALAYA

PARALYMPIC INFORMATION MANAGEMENT SYSTEM

Paralympic Athlete Management System

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ABSTRACT

The objective of PAMS is to provide a web – based Paralympic Athlete Management System (PAMS) in order to provide an athlete's information and manage the athlete information when organizing the games. This system will be used by Malaysian Paralympic Council (MPC) to replace their current system which is performed manually at this time being.

A survey has been carried out to evaluate the existing PAMS system which was developed by diploma student. The existing system have provided the basic knowledge of the requirement of PAMS and overview of the system flow. Besides, interview session also carried out with MPC, to understanding their system management in athlete information.

The functions provided by PAMS are able to search on data according to the different categories. Besides, PAMS offer notable protection against unauthorized access to server, database and document through Internet Information Server. There are two types of users on PAMS: administrator and general users. Administrator can be grouped into super administrator and assistant administrator. They authorize to do modification on data in the database while the general users is refer to staff of MPC which is not involve in the administrative. The general user only allowed to retrieve and search on data but they forbidden to make any changes on data in the database.

PAMS developed with Active Server Pages technology using Internet Information Server and running on Microsoft Window 2000 Professional. Microsoft SQL 7.0 is used in database management. Others software and development tools such as Microsoft Internet Explorer 5.0, Microsoft Visual InterDef 6.0 also be used in develop PAMS.

ACKNOWLEDGEMENT

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Background knowledge is essential in building up the PAMS system. As such my heartfelt thanks to lecturers of Faculty of Computer Science & Information Technology for their dedication in giving valued lectures on computing over the years.

It is greatly treasured that the Manager Paralympiad Malaysian & Event from Malaysian Paralympic Council (MPC), Mr. Kamaruzaman Kadir has kindly and willingly helped me in many ways from rendering precious advises to sparing their precious time attending to our queries.

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CHAPTER 1: INTRODUCTION

1.1 PROJECT OVERVIEW

This project is done to develop a web – based Paralympic Athlete Management System (PAMS) in order to provide an athlete's information and manage the athlete information when organizing the games. This system enables users to record, update and retrieves the new information required easily and also provides a quick search on the data.

Development of this system will be used by Malaysian Paralympic Council (MPC) to replace their current system, which is performed manually at this time being. MPC is a non – government organization and it signed the inception of a new era for the disabled. PAMS will provide a better management, administrative and dissemination of the athlete information. The athlete's information that is collected and determined by the administrator will be stored in the database through this system.

This system also yields from converting the traditional method in management athlete information in MPC to the computerized method. It provides the easiest way to access to the information that is stored in the server and enables the user to search and retrieve the data at any time, as the current system in MPC, which is performed manually now makes the storing and retrieving data very time consuming. This system is applied in order to change this condition, and speed up the administration process dramatically as MPC is lacked of manpower due to its non – government organization (NGO) status.

PAMS is developed on the client – server application and it is a web – based via Intranet or Local Area Networks. All the data or resources will kept in the server (particular computer) and to be shared with other computers through the network system. PAMS is divided into two main sections, which are the general

user section and administration section. General users are the staff of MPC. They are allowed to search and retrieve the data from the database but they are forbidden to do any modification on the data. For the perspective of system administration, administrators of MPC are allowed to add, delete and update the information of the athlete information in the database. They will be required the login identification and password when accessing to the administration section.

PAMS will integrate with two other systems, creating a more complicated information management system for the usage in MPC and this integrated system is named Paralympic Information Management System (PIMS). The other two systems are:

- Paralympic One – Stop – Center (POSC)
  POSC is a dynamic and interactive web site that provides and displays the information of MPC, sport information and athlete information.

- Paralympic Sport Management System (PSMS)
  PSMS is an application system that provides the sport information such as committee's organization of the events and so on.

Integration among the systems will provide efficient information for the users.

1.2 OBJECTIVE

An objective is a measurable goal that needs to accomplish. Below are the objectives of the project:

- To investigate into the current system which is using by Malaysian Paralympic Council (MPC) to develop a more effective system and produce a research document.

- To study and examine into the system designs architecture.
- To investigate into the techniques and skills, to analyze requirements and produce functional specification.
- To design, implement and test the units of the system.
- To produce a project reports that containing all of the pertinent investigation and decision.

Besides, the objectives of the system that is developed are as below:

- To provide computer system environment and paperless working environment with the purpose to improve the system management in MPC. This will overcome of the overload paperwork and also help to increase work efficiency and productivity.
- To reduce administration and management costs in terms of time, stationery and others.
- To ensure the data secure, unauthorized users are forbidden to modify the data in the database, only administrators, which have their own login identification and password, are allowed to do the changes on data in the database.
- To ensure up – to – date information of athletes.
- To creating a workgroup database for MPC's staff and administrator. Thus allowing them the ease of access to information at any time and anywhere via intranet.

- To increase performance in management operation which reducing the processing error and accurate manipulation of data with minimal human intervention.

- The effectiveness of this system that is developed will be measured in the aspect of efficiency, accuracy, flexibility, user – friendly and system performance.

1.3 PROJECT MOTIVATION

In MPC, the current system used for manage athlete information is performed manually, which are entire data or resources of athletes are kept in ordinary files. If the user does not know the file name, then he/she will have to search through all the files in the cabinet manually. Since, current system is more progressing with paper work, when come to maintenance the system, the work will sure become more troublesome and time consuming. Therefore, PAMS is developed to enhance the current system.

In addition, PAMS is based on client - server application, the entire data are stored in the server database. Therefore, it does not require the user to install any files on their computer and users can just easily retrieve the information through the system at any times from any location as long as they have accessed to the system via intranet. As a result, this system will enhances availability of athlete's information and also improve the system management of athlete's information. Besides, it converting the traditional method in management athlete information to the method computerizes. So that, it will reduce the expenses and manpower involve in administration.

1.4 PROJECT SCOPE

This project scope defines the system function, assumption, constraint and limitation of the proposed system. The project scope are stated as below:

1.4.1 System Function

System function of PAMS is divided into two main sections, which are general user section and administration section. General user section is referring to committee staff of MPC which are forbidden to access to administration section. They are only allowed to retrieve and search on data from the database but they are prohibited to do any modification on the data in the database.

Administration section is referring to the administrators of MPC, which they are allowed to add, update, and delete the data from the database. There are two types of administrator; super administrator and assistance administrator. Super administrator and assistance administrator are required login identification and password when access to administration section. Below are stated several modules which are included in each section:

- **General User Section**
  - Search engine module
- **Administration Section**
  - Security Module
    - Authentication Sub – Module
  - Administration Module

- Athlete Biography Sub – Module
- Game Village Sub – Module
- Result Performance Sub – Module
- Transportation Sub – Module
- Create Game Sub – Module

The details of each function can be found from Chapter 3 System Analysis

1.4.2 Assumption

- Fundamental of functional requirement and nonfunctional requirement are finalized at this stage of development phase.
- A firewall is implemented to ensure data safety and data integrity.

1.4.3 Constraint

- The targeted user of this system is only provide for staff MPC.
- Due to the limited time of this project, certain modules could be developed for future releases.

1.4.4 Limitation

- Security is only limited to login ID and validation of password. Other mechanism security is excluded in this project.

1.5 PROBLEMS OF CURRENT SYSTEM

Currently, the system that is using in Malaysian Paralympic Council (MPC) is performed manually. Using manually system is not effective and consequent a plenty of problems. Some of the problems of the current system are state as below:

- Storing a large numbers of data is not efficient and not effective by manually and management of athlete information is not systematic.
- Searching and retrieving information athlete is slow, unreliable and time consuming.
- No security guarantee of the system.
- A lot of expenses in operation and maintenance and also and much of manpower involved.

1.6 EXPECTED OUTCOME

Paralympic Athlete Management System (PAMS) provides easy to retrieve athlete information from database; getting data is faster than the current system and received data is more accurate. Furthermore, PAMS enhance system administration in the management of the athlete information. Below are the some expectation outcomes of this system:

- Storing entire information or data on server database.
- Template(forms) of the system is more attractive with their interface-Graphical User Interface (GUI) and user – friendly.

- Ability integration with the two others systems which are Paralympic One-Stop-Center (POSC) and Paralympic Sport Management System (PSMS).

- Easy operation, maintenance and effective. Reduce manpower involvement, templates are provided for administrator to manage this system.

1.7 PORJECT SCHEDULE

A project schedule describes the system development cycle for a particular project by enumerating the phases or stages of a project and braking each into discrete tasks or activities to be done. All the tasks consist of research, literature survey, system analysis, system design, system implementation, system testing, system evaluation and conclusion. With the proper project schedule planning, it will ensure that the project development process works out smoothly and leads to success. The schedule of this project is shown in Gantt chart in the Figure 1.1 as below:

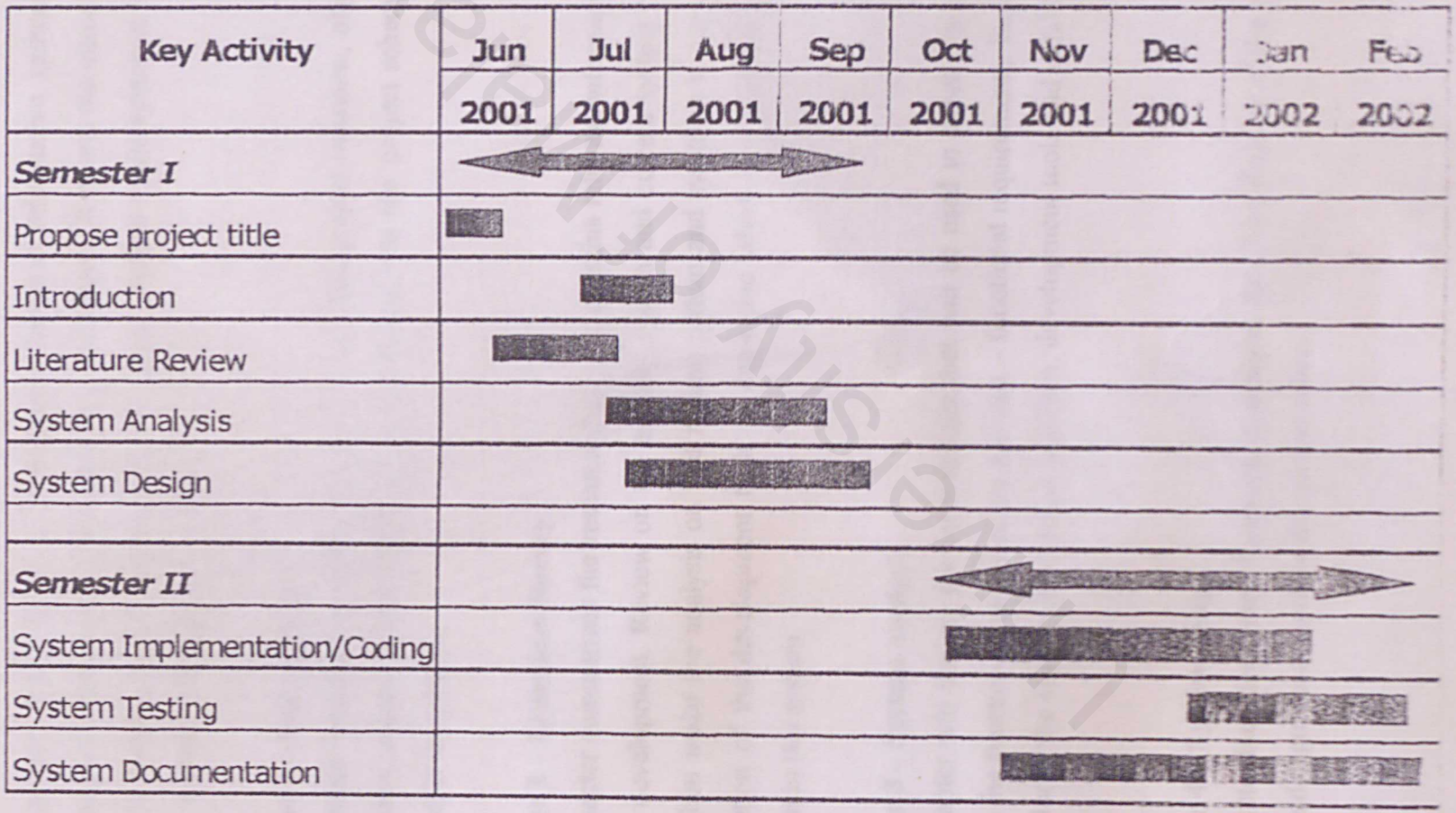


Figure 1.1: Project Schedule

1.8 REPORT OVERVIEW

The purpose of this report is to document essential information gathered and implemented throughout the development of the project. It covers the introduction, literature survey, system analysis, system design, system implementation, system testing, system evaluation and conclusion.

Chapter 1 – Introduction

This chapter provides an overview of the thesis. The project overview, objective, motivation, scope, problem defined, expected outcome and project schedule are included in this chapter.

Chapter 2 – Literature Survey

This chapter summarizes the research done and contains relevant information for project development. Review on the existing system and current system used in MPC, then make the analysis on that review system and synthesis it. Gather the information of the development tools to determine which development tools is pertinent in this system.

Chapter 3 – System Analysis

This chapter will discuss the methodology that will be used to develop a system, analysis the functional requirements and non – functional requirements. Besides, it also includes the reason why certain platform, development tools and database are chosen.

Chapter 4 – System Design

This chapter includes system functionality designs, data flow diagram of the system, database design, user interface design and others.

Chapter 5 – System Implementation

This chapter is emphasize on writing a program that implementing the system design, gives description of the development environment during the process if building the system, system implementation and how the system is tested.

Chapter 6 – System Testing

This chapter covers the purpose of testing and testing strategy. In additions, this chapter will discuss in details about the unit testing, integration testing and system testing.

Chapter 7 – System Evaluation and Conclusion

This chapter will focus on the problems encountered during development of the system (PAMS), discussion the system strengths, limitation and future enhancements could be incorporated in PAMS. Furthermore, conclusion of the project will also included in this chapter.

1.9) SUMMARY

This chapter described the general overview of the entire system will going to develop. The objectives of the developing this system, scope covered in PAMS, the assumption, constraint, and also the limitation of the system, which is to let the readers to have a better understanding of the PAMS. Chapter two will considers on some literature related to the system and analysis on the existing system.

CHAPTER 2: LITERATURE REVIEW

Literature review explains the finding sources and a more detail research regarding the certain topics or projects that is to be developed in the system. Idea, knowledge and experience were gained when the research were done in the process of preparing for the project proposal. Afford for developing Paralympic Athlete Management System (PAMS) for MPC went smoothly with the appearance of the useful and exact information.

2.1 MALAYSIAN PARALYMPIC COUNCIL (MPC)

Malaysian Sports Council fce the Disabled was formed in May 1989 with the Government's help and encouragement. It signed the inception of a new era for the disabled, promising swift ramifications in public awareness. Later on, Malaysian Sports Council was renamed as Malaysia Paralympic Council (MPC) in 1996. MPC remained a non – profit organization recognized and supported by the Ministry of Youth and Sports and the Ministry of National Unity and Social Development. MPC is a member of the International Paralympic Committee (IPC) and is affiliated to the Far East and South Pacific Federation.

MPC with the remarkable growth and progress have been largely due to the Malaysian government's solid backing. The organization's objectives and mission are strongly promoted by the Ministry of National Unity & Community & Development & the Ministry of Youth & Sports. In line with MPC's philosophy disabled athletes are encouraged to strengthen and reinforce their mind, body and spirit.

As a National Organization, MPC is entrusted with the management of several competitions, which include the Malaysian Paralympiad and ASEAN invitation every two years [1].

2.2 DEFINITION OF PARALYMPIC SPORTS

Paralympic Sports is defined as a sport for the disabled. The goals of emerge paralympic sport is to produce the disables to be more progressive, productive, pertinent and more integrate with social. Since this sport is important for them, MPC has taken it as a consideration and organize the paralympic game, which is known as Malaysian Paralympiad. It is twice yearly sports championship held especially for the Disabled at the national and ASEAN invitation level [2]. In line with MPC's philosophy, disabled athletes are encouraged to strengthen and reinforce their mind, body and spirit through the Paralympic sport. The objectives of Paralympic sport are:

- To give a wider participation opportunity to the disabled athletes at the state level across the country.
- In line with the "Sports For All" concept for participation, health, friendship and fun purposes. It is also in line with the "Sports Excellence" concept, which aims to portray the talent, skill and ability of the disabled athletes.
- To evaluate and recognize the talent and performance of the athletes in order to choose them to fill in the back-up squad, teen squad and national squad.
- To be physically and mentally prepared in all aspects of skill and experience.

2.3 DESIGNING, PLANING AND CONTROLLING EVENT LOGISTIES

The attention to the minutest detail critical to success in planning events is important. Every aspect of the events must carefully design to satisfy the needs of every constituency group.

In the process planning the events, asking the right question to gather as much information as possible is an importance criteria. Besides, some of the conditions that must first be determined before begin the logistics planning for each event, there are to have a good planning in the events, some basic requirements must be fulfilled such as the consideration on how large is the event, the numbers of participants and the event be held indoors, outdoor or both [3].

In the perspective on transportation, the athlete arrive and depart by private automobile, private motorcoach or public transportation (types of transportation, itinerary, and special needs) also must take in the consideration. Require transportation to and from their living accommodation, practice fields, and competition arena. When transporting athletes to and from the airport or competition and practice venue, request the appropriate type of vehicles very important. Moreover, continual monitoring is necessary to either increase or decrease the number of transportation in circulation on each traffic pattern.

Besides, housing available to accommodation all contingencies also must be determined. As a produce of a event for disable athlete, identify all venue limitations and remove barriers for the visually auditor ally and physically impaired also must be planned. Another unique logistical consideration in regard to producing sport events for the disabled is the various categories that must be included [4].

2.4 FINDING

There are several approaches of research was used in finding the sources in the literature review. The main objective of this is to find out more information about the real system had been used to manage the athlete information and also to find more supporting facts in architecture designing to develop PAMS. The end results of the useful and pertinent information through the research had been carried out will be implemented in development of the PAMS.

2.4.1 Reference Books

In order to have a better understanding on the terms, procedure and administration involved in system management of athlete information, reading some of the sport management reference books, brochure and so on were carried out. Besides, some reference books, which are related to the system architecture, system analysis, and system design also read through for better idea in the designing of the structure of PAMS.

2.4.2 Facilities Internet – Search Engine

Using the facilities provided by Internet such as Search Engine to find more details about system management information system. Besides, Search Engine was also used to find more information about development tools, platform system, web programming and so on before the hardware and software tools were determined in developing PAMS. The basic knowledge on Microsoft Visual Studio InterDev 6.0, Active Server Pages (ASP) and so on were gained through the web sites, which offers online tutorials.

2.4.3 Interview

An interview with MPC was also carried out in order to get the information in management of athlete information. Through the interview session, the interviewee Mr.

Kamaruzaman, the Manager of Paralympiad Malaysian and Events, provide a lot of information such as what system is currently using by MPC, what are the procedures in manage the athlete information, what are the process of organizes the games and so on. The information gained through the interview session will much help in develop PAMS. Besides, interview also carried out with Mr. Afizal Abu Othman, which is the officer in Sport Science Center, University of Malaya. Some knowledge in management sports also gained from him. The interview question also prepared and enclose in the appendix.

2.4.4 Existing System

The analysis on the existing system was also carried out in order to further enhance their weakness to improve on the PAMS. Although the previous PAMS system, which was developed by the previous diploma student is workable, but lack of many critical features that are always used in management system. So that, the weakness of the previous PAMS system needs to enhances and improve. Although the previous system is not used by MPC, but it gives a basic idea and knowledge of the whole system.

2.4.5 Existing Thesis And Others

Thesis reports prepared by former students were also used as form of references. These can found in the Faculty of Computer Science & Information Technology's document room. These theses served as a useful guidance especially in the process of preparing this report. Other resources of information that were also found included any system management related from article, newspaper, magazines and brochures.

2.5 SYSTEM REVIEW

To have a clear and better idea on develop this system, reviews on the existing system have carried out. Review on these existing systems is a crucial work, because it will let the developer more understand the system flow, what are the system needs, and also can make the improvement on the existing system.

2.5.1 The Existing PAMS

Paralympic Athlete Management System (PAMS) was developed by the diploma student from Faculty of Computer Science and Information Technology in the academic session of 2000 / 2001. Their pass thesis papers are studied and researched in detail [5]. It provides me with a basic knowledge of the requirement PAMS for further modification and enhancement to the existing PAMS. Although the existing system is a workable system but it does not used by the MPC in their management of the athlete information because short of many important features which are frequently used in system management. Since there are lacks of many significant features, which are needed in the system management, so the improvement of the system need to carried out.

The existing PAMS covered the whole basic flow system such as enable the administrator to entry the athlete's information and retrieve and displays the data which was entry. Besides, form designing of the system is based on user friendly to provide users easy to manage the system by themselves. Search engine also provided in the existing system but the capability of the search engine in finding data is very limited. It does not provide the features such as search with athlete name, country, sport and so on.

All the features there are provided in the existing system is not entire fulfill the requirement of MPC in their management. Therefore, the main objective of this project is to enhance the existing PAMS by adding more features to cater more complex processing use feature in system management.

The system should provide the feature log in user to ensure the information secure. The system also should protect the data from being modified by the unauthorized user except the administration who have their own login identification and password. Unauthorized users only allowed to retrieve the needed data without changes any information in the database. Search engine should provide more widely and ability in the searching of data such as search with athlete's name, country, name's of sport and so on. The more ability in searching will make the system more efficient in providing the information. Besides that some important scopes, which are frequent use in organize the athlete information is not include in existing system such as, accommodation and food, transportation, performance of athlete, training session.

As a result, some features that are frequently used should add in the existing system to enable the system more complex and efficient for further use in MPC.

2.5.2 Current System Used In MPC

The current system, which is used for manage the athlete information in MPC, is performed manually and not computerizes. The entire data is kept in an ordinary file and many processing of the works are involved in paper work. For instance in the process to get the athlete biography to store in files, they have to send the particular forms to the athlete to fill up. Then receive back the filled up form, after received this form, they have to document it and print it out to store in files.

Since there are not using the computerizes system, it will sure that redundancy work will occur and manpower involvement will increase. The data that is stored in file, if the users do not know the file name, then they will have to search through all the files in the cabinet manually. This work is troublesome and time consuming. By having the database for storing the data, users can find easily the data by searching through the database with the keyword.

MPC is a non – government organization and the support from the government are very little in aspect financial. All the support is came from the sponsors, volunteers and social workers; the staff of MPC only pay with a low allowance because short of financial. So that purpose of developing of this system is also as a contribute to MPC for reducing their expenses and manpower involvement in the administration.

2.5.3 System Management Used In Sport Science Center, University of Malaya

The system management that is used in Sport Science is also perform manually. They do not use any computerize systems to store the data of athletes. Usually, all the data of athletes are type it out in word document and stored in files. Besides that, from the interview, which I had conducted with Mr. Afizal Abu Othman, the officer in Sport Science Center, University of Malaya, he said that when to run a competition or tournament, a lot of forms will need to design for the participants to fill in and the data colleted will retype in word document, then will store in files. When they want to retrieve the data collected of the particular athlete information, they will need to go through manually to find the documents from the files.

Although the system management, which is using in Sport Science Center do not bring much troublesome to them in their management, but such kind of management is only suitable for manage in a small competition, it is not efficient when come to organize a large competition because it is very time consuming and a lot of manpower involve in managing the process of data collected.

2.6 DISAVANTAGES AND WEAKNESSES OF EXISTING SYSTEM AND CUURENT SYSTEM USED IN MPC

From the data collected and interview had been carried out, the existing system which is developed by the diploma students and the current system which is used in MPC are

shown some disadvantages and weaknesses. The disadvantages and weaknesses are stated as below:

- The existing system lack of some important features (scope) that is frequently used in system management of athlete information and the basic requirements are not fulfill, unable operation as a system management for MPC.

- The system security of the existing system is unreliable because all users are allowed to modify the data.

- The existing system is not built on web – based application, so that the information colleted is more difficult to share among the users when in the different location.

- The current system used in MPC, which is performed manually, is not efficient and effective for storing the large information in manually.

- Searching information athlete by manually is slow and wastes a lot of time.

- Redundancy of work in processing the information athlete will increase the manpower involvement.

- Maintenance of the system is difficultly and hardly since the files are store manually.

- Increase administration and management costs in terms of time, stationery and others.

2.7 Synthesis

From the information collected, I was gained a lot of information about the requirement for developing this system. Beside, some weaknesses also identify in the existing system, so that the improvement of the existing system need to carried out to enhance the system performance. Knowing the requirements and understanding the problems which is face by MPC will have a better way in solution and more effective to fulfill MPC needs.

Some of enhancements need to emphasize in the PAMS are divided into several aspects:

- Should cover all the basic requirements which are frequently used by MPC in manage the athlete information when running the games. Some basic fields must be included in the system are accommodation and food, performance of the athlete in each events, training session and athlete transportation.

- The information that is provided by the system should ensure the data correctness, accuracy and integrity. As a result, the system secure should be emphasized in the PAMS to avoid an unauthorized users to modify the data. They login identification and passwords are need when access to the administration section.

- Capability of search engine in finding data should improve. Provide more alternative search on data such as search with athlete's name, country, name's of sport and others. It will let users retrieve the data more accurate.

- System is built on client – server application. All the athlete information will store in the server database and it is easy for the users to access to the data although in the different location.

2.8 SYSTEM ARCHITECTURE

2.8.1 Mainframe Architecture

It is not a client/server architecture. With mainframe software architectures all intelligence is within the central host computer. Users interact with the host through a terminal and send that information to the host. Mainframe software architectures are not tied to a hardware platform [6].

- ☒ Disadvantages

  Do not easily support graphical user interfaces or access to multiple databases from geographically dispersed sites.

2.8.2 File Sharing Architecture

It is not a client/server architecture. The original PC networks were based on file sharing architectures, where the server downloads files from the shared location to the desktop environment. The requested user job is then run in the desktop environment [6].

Disadvantages

- ☒ Work if shared usage is low, update contention is low, and the volume of data to be transferred is also low.

2.8.3 Client / Server Architecture

As a result of the limitations of file sharing architectures, the client/server architecture emerged. This approach introduced a database server to replace the file server. Using a relational database management system (DBMS), user queries could be answered directly. The client/server architecture reduced network traffic by providing a query

response rather than total file transfer. It improves multi-user updating through a GUI front end to a shared database [7]. There are various clients – server architecture. Basically, they can be divided into three main categories such as single tier, two – tier, multi – tier client – server architecture.

Typically, an application has three basic layers, there are:

- Presentation logic
  Presentation layer is where the user interfaces are build. It is the front – end layer that interacts directly with user.

- Business Logic
  Business layer will handle the business rules of the application

- Data Access Logic
  Data storage and retrieval are handle by the data access logic. It plays important roles in data integrity and maintenance.

2.8.3.1 Single – Tier Client – Server Architecture

The single – tier architecture is the first generation of client – server system and it has a single application layer to support the user interface, business rules and the data access logic. In this architecture, data can be stored not in the same location as the application but the data access logic is in the application layer.

2.8.3.2 Two – Tier Client – Server Architecture

Figure 2.1 depicts the design of two-tier client server architecture. The user system interface is usually located in the user's desktop environment (presentation layer) and the database management services are usually in a server (data access logic). That is a more

powerful machine that services many clients. Processing management is split between the user system interface environment and the database management server environment. The database management server provides stored procedures and triggers [6].

Two tier architectures consist of three components distributed in two layers: client that is requester of services and server that is provider of services. The three components are

- User System Interface such as session, text input, dialog, and display management services
- Processing Management such as process development, process enactment, process monitoring, and process resource services
- Database Management such as data and file services.

The two-tier design allocates the user system interface exclusively to the client. It places database management on the server and splits the processing management between client and server, creating two layers. Two tier software architectures are used extensively in non-time critical information processing where management and operations of the system are not complex. This design is used frequently in decision support systems where the transaction load is light and requires minimal operator intervention.

Advantages of Two – Tier Client – Server

- ☑ Two –tier client – server architecture dramatically reduces network traffic compare with single – tier system
- ☑ The system can be implemented quickly and thus cheaply using rapid application development (RAD) techniques and it is suitable for small workgroup type environment. In addition, using RAD techniques can ensure the user's requirements are fulfilled completely.

Disadvantages of Two – Tier Client - Server

- ☒ The performance of the system deteriorates as networking bottleneck occur when an optimum number of users is exceeded. Besides that, each client site requires separate database performance.

- ☒ For the fat client – server, the workstations require powerful CPUs (Computers Processing Units) and large amount of disk and memory. Moreover, it is not suitable for environment with rapid changes in business rules because when business logic changes, to update the software on numerous workstations can be excessive.

- ☒ Security of two-tier client – server system us complicated a user may require a separate password for each database server accessed.

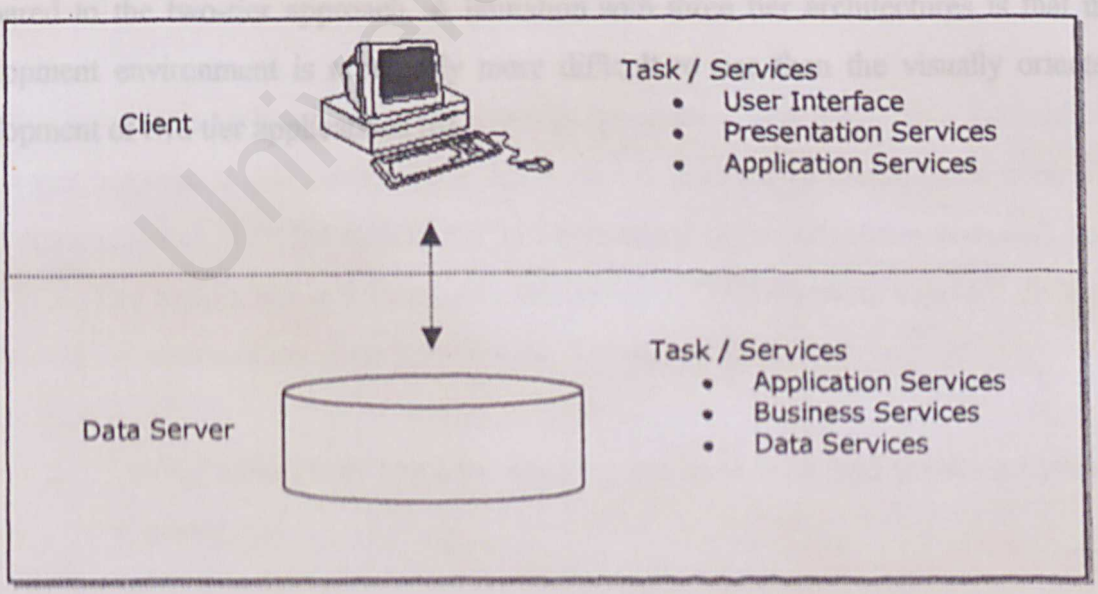


Figure 2.1 Two –Tier Client – Server Architecture

2.8.3.3 Three - Tier Architecture

The three – tier software architecture (three layer architecture) emerged in the 1990s to overcome the limitation of the two – tier architecture [8]. Figure 2.2 depicts the three – tier architecture.

In this architecture, a middle tier was added between the user system interface client environment and the database management server environment. The middle tier can perform queuing, execution, and database staging. For example, if the middle tier provides queuing, the client can deliver its request to the middle layer and disengage because the middle tier will access the data and return the answer to the client. In addition the middle layer adds scheduling and prioritization for work in progress.

The three-tier client/server architecture has been shown to improve performance for groups with a large number of users (in the thousands) and improves flexibility when compared to the two-tier approach. A limitation with three tier architectures is that the development environment is reportedly more difficult to use than the visually oriented development of two tier applications [6].

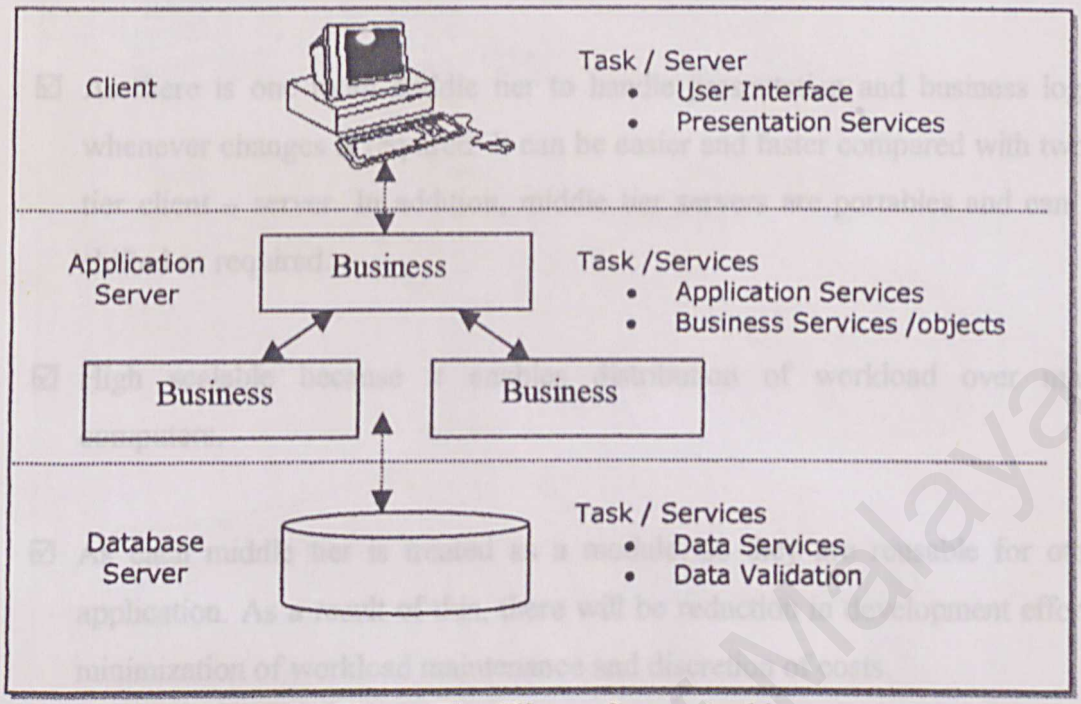


Figure 2.2 Three- Tier Client – Server Architecture

2.8.3.4 Multi – Tier Architecture

A further extension to three – tier solutions is the multi – user (n – tier). An addition middle tier between a thin client and a thin server is inserted to create three tiers. The client communicates with the middle tier using standard communications protocols such as TCP/IP. The middle tier interfaces with the backend RDBMS using standard database protocols or by means of database middleware. It is responsible for

- Acting upon client requests, applying business logic and invoking database requests.
- Handling database responses, applying further business logic and generating a client response.

Advantages of Multi – Tier Client – Server

- ☑ As there is one more middle tier to handle presentation and business logic, whenever changes is required. It can be easier and faster compared with two – tier client – server. In addition, middle tier servers are portables and can be shifted as required.

- ☑ High scalable because it enables distribution of workload over many computers.

- ☑ As each middle tier is treated as a module, so they are reusable for other application. As a result of this, there will be reduction in development efforts, minimization of workload maintenance and discretion of costs.

Disadvantages of Multi – Tier Client – Server

- ☒ There are more task to undertake and complex to address than two –tier architecture because multi – tier client – server enables additional tier in between client and server meantime it also increase and fault tolerance.

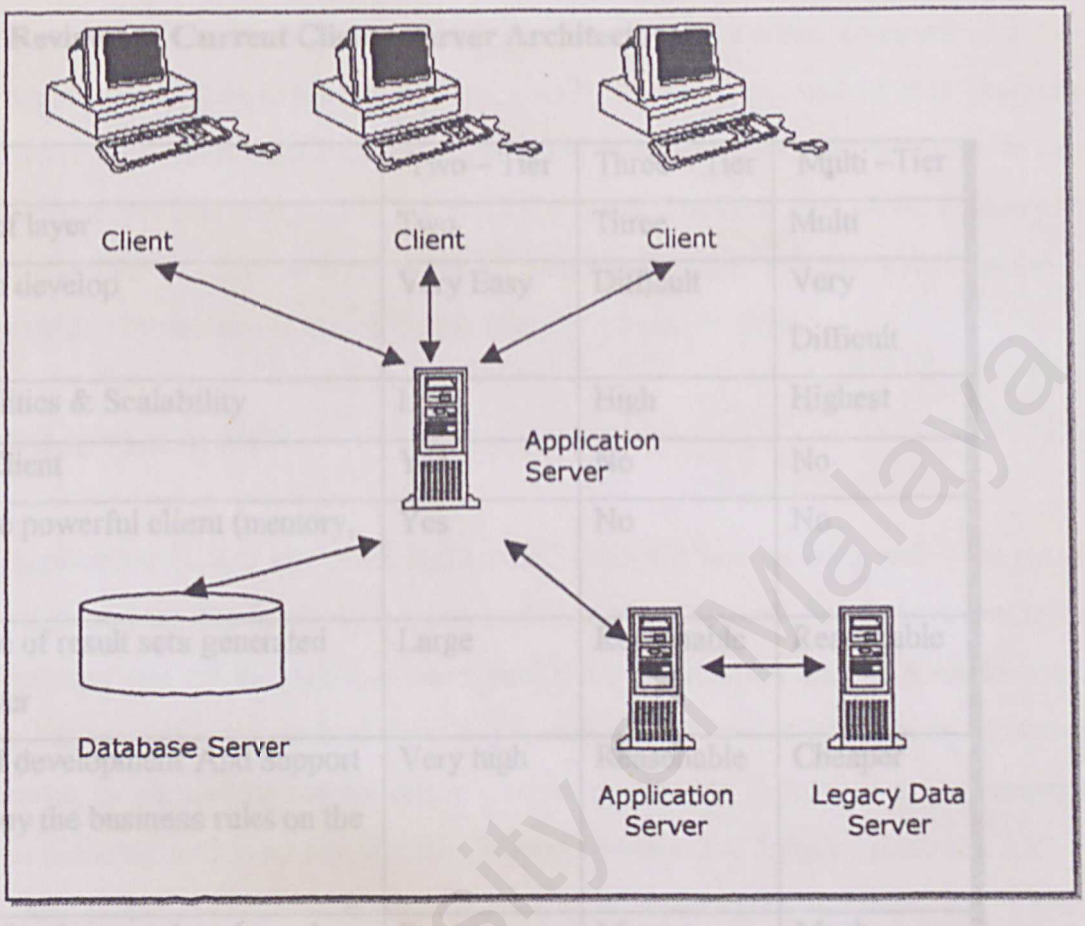


Figure 2.3 Multi – Tier Client - Server Architecture

2.8.4 Review On Current Client / Server Architecture

	Two – Tier	Three – Tier	Multi –Tier
Level of layer	Two	Three	Multi
Easy to develop	Very Easy	Difficult	Very Difficult
Flexibilities & Scalability	Low	High	Highest
Fat – Client	Yes	No	No
Require powerful client (memory, etc)	Yes	No	No
Volume of result sets generated by server	Large	Reasonable	Reasonable
Cost of development And Support to deploy the business rules on the client	Very high	Reasonable	Cheaper
Total of tasks to undertake and complex issues to address	Fewer	Many	Much
Required separate database connection per workstation	Yes	No	No

Table 2.1 Reviews On Current Client – Server Architecture

2.8.5 Client – Server Versus Stand – Alone Architecture

A computer does not connect to other computes is called a stand – alone computer. The data and programs in a stand – alone computer are not shared with the other computer. The hard disk, printers and other hardware connected to a stand – alone computer can only be utilized through the computer. They are connected to and in accessible to another computer [9].

Client Server is a computer in a network can function either as a server computer or a client computer according to the role it plays. Usually the resources such as data, program and hardware to be shared are kept in one particular computer. The other computer on the network can access this computer to use these resources. The computer serves resource to the other computer is called a server computer whereas the other computers that use the server provided by the server are called the client computer or client.

2.9 WEB APPLICATION

A web application is like any other application, except it resides on a web – server. A web application uses the Internet / Intranet and browser to present data and retrieve input. As the primary use of the web has been publishing information and graphics to users. Web application can also evolves from traditional client / server application. However, implementing or converting current client – server application to Internet system requires extension planning and is no simple task. Web application use Intranet protocols such as TCP/IP, HTTP, and HTML for information display and networking protocols [10].

2.9.1 Intranet

Intranet is the deployment of Internet technology behind a firewall, for use internally by a company's employees or private corporate information and collaboration systems [11]. In other words, it is a private network, usually a LAN or WAN, that enables the use of Internet-based applications in a secure and private environment. As on the public Internet, Intranets can host Web servers, FTP servers, and any other IP-based services.

Companies have been using private networks for years to share information but old private networks did not have consistent interfaces, standard ways to publish information, or client applications that were capable of accessing diverse data stores. The two things that distinguish intranet from the Internet is who can access them and from where they

can be accessed. If an application can be used over the public Internet, it will work on private intranets too.

2.9.2 Evolution of Client – Server to Web – Based Architecture

Both client – server and web –based architecture are the representatives of the current state – of – the – art in computer development technology with both of these architecture. It is believed that the roles of client and server in client – server system able to provide the best of the traditional client – server architecture if designed correctly.

2.9.3 Traditional Client – Server Architecture And Web –Based Architecture

The differences between traditional client – server and web server are:

- Ease of Maintenance

  In web – based architecture, modification on an application can be done easily without configuration on user's computer. Moreover, the client able to access web – based without having the program installed in the computer, a web browser is adequate. This is suitable for a large organization or organization with branches all over the place. But in traditional client – server architecture, installation and upgrading of application involves each client's computer.

- Adaptability

  Client – server enable to take advantages of new computer technologies. Meanwhile, web –based system represent a retreat towards centralized computing, away from the empowering effect of desktop computing.

- Thinner Client

  A traditional client – server application results in a fat client while web – based application is in a much thinner client and it is more reliable as a web client has less failure and more error prone.

In summary, a web – based architecture provides a less complicated application, better performance, flexibility, scalability and the possibility of bringing in some new interesting new technologies.

2.9.4 Web – based Client – Server Architecture

Same as multi – tier client – server architecture, web – based client – server has three basic layers such as the presentation layer, the business logic layer and the data access layer.

- Presentation Layer

  Presentation layer will be the web browser and web authoring tools such as Netscape Navigator and Internet Explore. It also provides user interface for users to navigate the World Wide Web (WWW) and cooperate web server and databases. Web authoring tools are tools that let users create HTML documents will be places in HTTP server or web server. These documents will be available for the employees of the corporate company or WWW users.

- Business Logic Layer

  Business logic layer is for the web server, application development environment and tools as well as middleware. Web server will functioning as a "Web Police" who manage and secure the traffic using firewalls and encryption and it will assist in development efforts and ensure the web site availability and smoothly whereas application development environment

and tools are for application development as well as augment existing client server system with the web echnology.

- Data Access Layer

  Data access layer is normaly where the database is handled. Data retrieval and access is handle via Web Server.

2.9.5 Multi – Tier Client – Server In Web Technology

Web computing is implementing the multi – tier computing to take the advantages of multi –tier architecture. The advantages are as follow:

- Internet – Ready Structure:

  Multi – tier architecture has a structure that is suitable for Internet and WWW technology. The operating system, application and data are resided on middle server instead of user's computer and users will access the application and data via web browsers.

- Easy Maintenance

  Business logic is provided by the middle – tier of multi – tier system, so the maintenance of business logic only will involve the server. This avoids a manual installation proces on every desktop that can be very costly and time consumed if the popultion of users is large.

- Security

  The multi – tier system is distributed architecture. Thus, security is needed to control over sensitive data. With this structure, different level of access control can be implemented and the administrator of the access control will be done at the server site.

- Flexibility And High Adaptable Architecture

  The multi – tier architecture enables the business logic to be designed on a well manner that provided easy extension or enhancement.

2.9.6 Web Server Technology

The www is the truly intergalactic client – server application. This new model of client – server consist of thin, portable, "universal" clients that talk to super fat and server. In its simple incarnation, a web server returns documents when client asks for them by name. The client and server communication using a protocol called Hypertext Transfer Protocol (HTTP). This protocol is passed as strings, with no provision for typed data. The web is being extended to provide more interactive forms of client – server computing [12].

2.9.6.1 Internet Information Server (IIS) 5.0

Internet Information Server (IIS) is Windows 2000 professional built-in web server. With IIS 5.0, Microsoft introduces a new paradigm to the web-transactional applications. Transactions are the plumbing that now makes it possible to run real business applications with rapid development, easy scalability and ATOMIC reliability [13].

IIS 5.0 brings together the power of Window NT Server, with the best of client / server development, and the ubiquity of the Internet to create the first Web platform for true distributed applications. The server services provided by IIS are WWW, FTP and Gopher. The features of IIS are:

- Compatible implementation of the current open Internet HTTP 1.0 standard for Web servers
- Fully integrated into the operating system

- Only web server integrated into a network operating system
- Part of the Windows 2000 Professional Installation, which means that IIS is up and running with Windows 2000 Professional
- Single user directory for all Web servers.

2.9.6.2 Apache

Apache is a freely available Web server that is runs on most UNIX-based operating systems such as Linux, Solaris, Digital UNIX, and AIX), on other UNIX/POSIX-derived systems such as Rhapsody, BeOS, and BS2000/OSD, on AmigaOS, and on Windows 2000. According to the Netcraft (www.netcraft.com) Web server survey in February 2001, 60% of all Web sites on the Internet are using Apache (62% including Apache derivatives), making Apache more widely used than all other Web servers combined. Apache complies with the newest level of the Hypertext Transport Protocol, HTTP 1.1. Free support is provided through a bug reporting system and several Usenet newsgroups. Several companies offer priced support [14].

2.9.6.3 Chili!Soft ASP

Chili!Soft ASP is a Web application server based on the ASP architecture, standard for Web application. It is a complete platform for the rapid development of sophisticated web – based application Chili!Soft ASP includes scripting language, built in state and session management and easy database access. Chile!Soft is a high performance engine with features such as Just-in, Time Page Compilation, automatic process fail – over and restart, multi – threaded of multi – process configuration and page caching [15]. With versions for both NT and UNIX, user can build and host web application across multiple. Platform Chili!Soft ASP is available for Netscape, Apache, and Lotus Web Server on Window NT, Solaris and soon HP –UX and OS / 390 [16].

2.9.6.4 Comparison Between IIS 5.0 and Apache Server 1.2

Features	IIS 5.0	Apache Server 1.2
Platform available on	Window 2000 Professional	NetBSD, Digital UNIX, BSDI, AIX, OS/2,SCO,HPUX, Novell NetWare, Macintosh, Be OS, Windows NT, LINUX, Windows 95, FreeBSD, Windows 98,IRIX & Solaris.
Pricing	Free with window 2000 Professional option pack	Free
Setup Administration	Simple setup procedures and integrated management tools	Setup more difficult has poor administration tools
Authentification & security	Very strong Authentification & security features	No certification support
Logging	Extended logging facilities. Able to logging into my ODBC database	Have a number of same logging facilities with Netscape Enterprise Server 3.01.Able to logging into my ODBC database via add-on.
Internet services support	HTTP 1.1 compliant. Able to access HTTP Host Header sites using any browser. Integated SMTP support. Integrated NNTP support	HTTP 1.1 compliant

Table 2.2: Comparison Between IIS5.0 and Apache Server 1.2

2.9.7 Web Browser

A browser is a client program (application) that is a used to search through the information provided by a specific type of server. A browser helps you to vies and navigate through the information on the Internet. The first browser for the Web was Mosaic. The browser developed by Mark Andresen in 1993. The creation of the browser

made the Internet easier to access. The Web browser provides a graphical, text – based terminal interface to the web server. This terminal approach provides an interface between the user and the web server. The web browser translates client requesting information sent by the web server into a graphical user in sending the request of the client in the HTML from the web server.

2.9.8 Web Publishing Technology

2.9.8.1 Server – Side Scripting Language

A server – side script is a script that is interpreted by the web server. It is an instruction set that is processed by the server and the resulting data is sent to a client. When an HTTP request is made for the server – side script, the file are to be processed on the server before being returned to the client. The server interprets the server –side script instructions and translates them into appropriate HTML code. The server then returns the whole file as pure HTML, which is then interpreted by the browser [13].

2.9.8.1.1 Hypertext Markup Language 4.0 (HTML)

HTML 4.0 was the final version of the Hypertext Markup Language (HTML) before the Extensible Markup Language (XHTML) and remains the set of markup on which most large Web sites today are based [17].

Below are the features introduced of HTML 4.0:

- The cascading style sheet, the ability to control Web page content at multiple levels.
- The ability to create richer forms
- Support for frames which is already supported by the major browsers

- Enhancements for tables that make it possible to use captions to provide table content for Braille or speech users
- The capability to manage pages so that they can be distributed in different languages

2.9.8.1.2 Active Server Pages (ASP)

Active Server Pages (ASP) is a server – side scripting environment that can be used to create and run dynamic, interactive web server application [18]. It works by allowing us the functionality of a programming language; write programming code that will generate the HTML for the web page dynamically. ASP combines the HTML pages, script, and Active X components to create dynamic interactive Web content or powerful Web –based applications. It is the server based technology from Microsoft Corporation.

ASP is an approachable, language neutral, compile – free environment that allows users of all levels to easily create dynamic Web content or powerful Web based applications. ASP documents can both HTML syntax and server – side script logic. When the server receives an HTTP request for the ASP document, a "virtual" output of HTML file is generate in memory for the response using a combination of both the HTML static information plus any HTML that is generated by the scripting.

Client – side is decoded and run by the browser itself. However, ASP script is decoded and run by Microsoft Internet Information Server (IIS) in order to create web pages to the browser. The client side and ASP scripts can be written in any scripting languages such as VBScript and JavaScript. Client – side scripting can be inserted into an HTML page using the <SCRIPT>...</SCRIPT>tags pair, and can be incorporated within minimal effort. To identify the script language, the LANGUAGE attribute is used. More than one script language can be used simultaneously in the same HTML file.

ASP is supplied with a component called the Database Access Component. This provides us with a whole hierarchy of objects – ActiveX Data Object (ADO). It allows easy but powerful connections to be made to almost any database system suitable for publishing and collecting data on the web.

Besides, ASP is also considered as a glue technology, with binds together other various server – based system to help build interactive web pages. It is able to interact with almost any existing dynamic web page technology such as Common Gateway Interface (CGI), Internet Server Application Programming Interface (ISAPI) and script.

2.9.8.1.3 Common Gateway Interface (CGI)

The common Gateway Interface (CGI) allows Web servers to execute other programs and incorporate their output into the text, graphics, and audio sent to a web browser [18] .CGI programmers use tools that provide for forms processing, looking up records in a database, or sending e – mail. In other words, CGI applications are more like a system utility than full – blown applications; scripts are task – oriented rather than process – oriented.

A CGI script has s single job: it initializes, does its job, and then terminates. It's easy to chart data flow and program logic, but CGI has its limitations:

- CGI programs take more time to write and debug; thus having frequent 'down' time for Web sites
- CGI programming is consistently out performed by ASP and is five times slower
- CGI Web pages are "non – dynamic", thus continuous changes cannot be made "on the fly"

- CGI is not inherently multi – threaded (ASP is), which limits the number of concurrent users

CGI uses a greater amount of server resources degrading performance if servers and sites.

2.9.8.1.4 ColdFusion Markup Language

ColdFusion Markup Language (CFML) is a Web page markup language that allows a Web site developer to create pages with variable information such as text or graphics that is filled in dynamically in response to variables such as user input. Along with the usual Hypertext Markup Language (HTML) tags that determine page layout and appearance, the page creator uses CFML tags to bring in content based on the results of a database query or user input. CMFL is a proprietary language developed for use with ColdFusion.

CFML tags perform all server-side tasks such as database queries by condensing complex tags perform all server – side tasks such as database queries by condensing languages such as Java or C++, into four basic tags:

- CFQUERY, which is used to submit a structured query language (SQL) request to the database;
- CFOUTPUT, which is used to display the result of a query;
- CFTABLE or CFCOL, which are used to display a preformatted table containing the results of a set of queries. Files created with CFML are saved as ColdFusion templates and use a ".cfm" extension.

2.9.8.1.5 Comparison Between Major Web Publishing Language

Below is the comparison between options [19].

Criteria	Common Gateway Interface	Cold Fusion	Active Server Pages
OS support	UNIX, DOS, Mac. Windows and others	Windows and Sun Solaris	Windows and Sun Solaris
Web Server Compatibility	UNIX, Windows, Netscape and Mac Web servers	Windows Web Servers and Netscape's Web Servers	Window Web Servers and Netscape's Web Servers
Scripting Languages	C/C++, Perl, VBScript, JavaScript	Cold Fusion Markup Language	VBScript, JavaScript, Perl
Hardware Requirement	None	None	None
Software Requirement	None	Cold Fusion Package	None
Learning Issues	Not very easy to learn	Easiest of the three to learn	Easy to learn
Greatest Advantage	Platform independence and multi – language support	Designed especially for publishing databases	Rapid application development in a team setting
Limitation	Resource intensive on server if there are multi – language support	Highly Database centric. Limited by CF tags	Highly IIS dependent. Compatibility with other web servers not very good.
Costs	Development costs	Product, License and Development costs	Development costs

Recommendation	Good for almost any application except when then are going to be large number of hits simultaneously	Good for applications accessing databases like a E-Commerce site and handling large number of hits	Good for almost any kind of application. Works especially well in a Windows 2000 professional environment.

Table 2.3 Comparison between major options for Web Publishing Language

2.9.8.2 Client – Side Scripting Language

Client – side scripting involves the execution of the scripting language by the browser that interprets the web page. The client – side scripting specific that is dependent on the type of browser that executes the script without contacting a server. Client -side scripting is not very secure because the code is visible to the user[13].

2.9.8.2.1 VBScript

Microsoft Visual Basic Edition (VBScript) is a subset of the Microsoft Visual Basic Language [20]. VBScript is available as a part of Microsoft Internet Explore (IE) and Internet Information Server. It is directly comparable to Microsoft JavaScript when it is used in IE. VBScript is does not produce standalone applets but is used to add intelligence and interactivity to HTML documents.

Unlike Visual basic, VBScript is not used a designed environment. Users cannot lay out forms and user interfaces by dragging and dropping control. Instead, VB Script is an after-the –fact language. The placement of ActiveX controls on a web page, and how they got there is VBScript's true concern.

2.9.8.2.2 JavaScript

JavaScript is an interpreted programming or script language from Netscape. It is somewhat similar in capability to Microsoft's Visual Basic, the UNIX-derived Perl, and IBM's REX. In general, script languages are easier and faster to code in than the more structured and compiled languages such as C and C++ [21].

JavaScript is used in Web site development to do such things as:

- Automatically change a formatted date on a Web page
- Cause a linked-to page to appear in a popup window
- Cause text or a graphic image to change during a mouse rollover

JavaScript uses some of the same ideas found in Java, the compiled object-oriented programming derived from C++. JavaScript code can be imbedded in HTML pages and interpreted by the Web browser or client. Besides, also run at the server as in Microsoft's Active Server Pages before the page is sent to the requestor.

2.10 Development Platform

Development platform is referring to operating system, which is using to develop the system or other application. Use the pertinent platform for developing the application is crucial. There are several operating systems which is always used in developing system:

2.10.1 Window 2000 Professional

Windows 2000 Professional is a commercial version of Microsoft's evolving Windows operating system. Previously called Windows NT 5.0, Microsoft emphasizes that Windows 2000 professional is evolutionary and "Built on NT Technology." Windows 2000 professional is designed to appeal to small business and professional users as well

as to the more technical and larger business market for which the NT was designed It is used to run software applications, connect to Internet and intranet sites, and access files, printers, and network resources.

Besides, built on Windows NT technology and the easy-to-use, familiar Windows 98 user interface, Windows 2000 Professional gives users increased flexibility. The integrated Web capabilities let you connect to the Internet from anywhere, at anytime—give accessing to host of flexible, cost-effective communications options. Furthermore support and administrative staff will particularly appreciate the reliability and manageability enhancements that make desktop management simpler and more efficient [22]. Windows 2000 Professional are able:

- Rely on PC to be up and running with enterprise level quality.
- Work the way you did with Windows 98, only much faster. Combine the ease of Windows 98 with the manageability, reliability, and security of Windows NT, at speeds 30 percent faster than Windows 98 on PCs with 64 MB of RAM or more.
- Communicate, share information, and use the Internet quickly and easily. With integrated support for Internet-enabled applications, business software developers incorporate the new ways to create and share information made possible by the Internet.

2.10.2 Microsoft Windows NT Server 4.0

Microsoft Window NT Server 4.0 is a complete and powerful platform that provides server operating system. It provides the backbone for a complete, organic system, where all elements working together seamlessly [23]. When it is joined with other Window NT-related products, including the BackOffice family of application and Window NT Workstation, Window NT Server provides the foundation for a powerful and well integrated environment. The introduction of new management tools in Windows NT

Server 4.0 and the Option Pack has provided great assistance in setting up Web Sites, managing the content and analyzing usage patterns for improvement. It serves as platform to publish and share information in a secure way over Intranet and Internet. The standard features of Microsoft Windows NT Server 4.0 are as below: -

- Windows 95 User Interface
- Administrative Wizards
- Network Monitor
- System Policy Editor and User Profiles
- Task Manager
- Internet Information Server
- Microsoft Index Server
- Microsoft Front Page
- RAS Multilink Channel Aggregation
- Point-To-Point Tunneling Protocol (PPTP)
- Improved Features Printing Enhancements
- Improved Window NT Diagnostics Tool
- File and Printer Sharing
- Improved Scalability
- Faster Internet Server

2.10.3 UNIX Operating System

UNIX is an operating system that originated at Bell Labs in 1969 as an interactive time-sharing system. UNIX has evolved as a kind of large freeware product, with many extensions and new ideas provided in a variety of versions of UNIX by different companies, universities, and individuals.

UNIX operating systems are used in widely sold workstation products from Sun Microsystems, Silicon Graphics, IBM, and a number of other companies. The UNIX environment and the client/server program model were important elements in the

development of the Internet and the reshaping of computing as centered in networks rather than in individual computers. Linux, a UNIX derivative available in both "free software" and commercial versions, is increasing in popularity as an alternative to proprietary operating systems. Figure 3.1 shows the components and layers of UNIX.

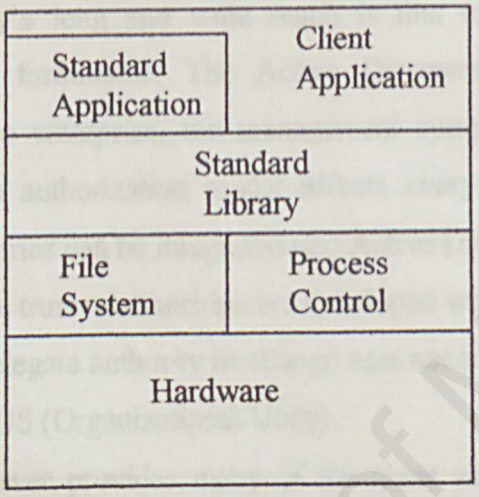


Figure 2.4: Layers of UNIX System

2.10.4 Solaris

Solaris is the computer operating system that Sun Microsystems provides for its family of Scalable Processor Architecture-based processors as well as for Intel-based processors. Sun's SPARC/Solaris systems became the most widely installed servers for Web sites. Sun emphasizes the system's availability that meaning it seldom crashes, its large number of features, and its Internet-oriented design [24].

Below are some features of Solaris that Sun emphasizes:

- Its availability is to add new capability or to fix problems without having to restart the system. Because it has evolved through a number of versions, it is "stable" and it has exercised and fixed almost any code path that might break.

- Its scalability. If you move to a larger processor and run faster.

- It is built for network computing.
- It includes security features.

2.10.5 Window 2000 Versus Window NT 4.0

- Window 2000 was twice as fast as Window NT 4.0
- Active Directory's long and wide reach is that make window 2000 both completing and formidable. The Active Directory model integrates with everything in the enterprise, the management components will touch every desktop, and its authorization model affects every user. In addition, other enterprise directories can be integrated into Active Directory.
- In Window 2000, trust relationships are developed within domains.
- Able to easily delegate authority to change user accounts spread across several window 2000 OUS (Organizational Units)
- Window NT Server provides many of the same services found in Window 2000, however it lacks an extensible, hierarchical directory. Although the directory for managing users and groups and single logon services. It is less comprehensive than the feature – set in rather Active Directory or Novell Directory Services (NDS).

2.11 Database Server

The database server is very important in the Internet application development. It can be used to store and retrieve the information that is stored in a database. The database connects to the web server acts as the client to the database server.

2.11.1 Microsoft Access

It is a relational database management system. Together with the ODBC driver for accessing, data can be retrieved from the database to the client / server application.

2.11.2 Microsoft SQL Server 7.0

Microsoft SQL Server 7.0 is a significant tool in many regards. Form data warehousing to application that require not only a large amount of information, but also many different simultaneous users, SQL Server is a key component in answering data management requirement. It is a powerful and comprehensive database.

Microsoft SQL Server is an example of n – tier system. The user can manipulate the data directly form the client side most of the time, the data is validate before it is updated into the database in server side. It is tightly integrated with the Microsoft Back Office family product to enable organization to improve decision. Making and streamline the business process. It is the best database for Window 2000 Professional.

Microsoft SQL Server 7.0 referential integrity and security and ensures that operation can be recovered in the event of numerous types of failure. SQL Server can control the access for the type of information that can be retrieved by the user. SQL Server supports Internet database integration. It allows the user to automate the publishing of database information in HTML documents. It allows users to build active Web sites and conduct processes don the Internet. It gives user the complete Internet database publishing capabilities when combining with Internet Information Server and the SQL Server Internet Connector.

It provides function for transparent distributed transactions that is the automatic distributed update capability across two or more SQL Server transparent to the desktop application this making it simple to use. It also guarantees the integrity of transaction of updating spanning multiple Servers.

2.11.3 Oracle 8i

Oracle 8i is the world's leading vendor of database software Oracle's ability have all data and document stored in a small number of high performance database benefits customers by centralizing all their data, making information management and access easier, more reliable and less expensive[25]

the ground –breaking capabilities of Oracle 8i's Internet File System (iFS) provides a single,easy to user data management interface for all data types, thus minimizing customer's reliance on a proprietary operating system. Oracle is an open solution and it supports all kind of platform. Oracle's advanced security features processing and replication, and the ability to use additional external authentication mechanisms.

Oracle uses a Java –based utility that provides everything needed to get a pre – tuned and pre – configured Oracle 8i database up running. Integrated management console for central administration of multiple server. It also contains some advance functionality servers. It also contains some advance database, and managing complex change in the database environment.

2.11.4 Comparison Between Microsoft SQL 7.0 and Oracle 8i

- SQL Server can run only on windows but for oracle the operating system will essentially become irrelevant. Oracle supports all kind of platform.
- SQL Server is more ease to use system compared to the oracle database. It provides more user- friendly graphical tools for installations, configuration and administration.
- With integrated management of text, images, audio and video, oracle 8i is inter – media enables customers to take advantages of the multimedia nature of the web.

- For SQL, it advocates a strategy of storing non – traditional data in flat files in separate server and linking them together using OLE –DB

- Microsoft SQL Server 7.0 tightly, integrated with other Microsoft Products:

  - Integration with Microsoft Exchange Server provides reliable and scalable Internet and Intranet collaboration and messaging – supporting SQL Server initiated trigger and store procedure – based messaging and replication of Exchange public folders.

  - Seamless integration with Window 2000 Professional security, a web application environment and Microsoft Transaction Server suppor.

2.12 Development Tool

2.12.1 Microsoft Visual InterDev 6.0

Microsoft Visual InterDev 6.0 is the latest version of the award-winning integrated web application development system for professional programmers. The new version enables Web teams to design, build, debug, and deploy cross-platform Web applications faster than ever before.

Visual InterDev 6.0 also features a new integrated WYSIWYG editor for ASP & Dynamic HTML pages, enhanced database programming tools, and end-to-end debugging facilities for multi-tier applications built with HTML and Script.

☑ **Advantages**

Allows professional developers to design, build, debug, and deploy cross-platform HTML + Script based Web applications faster than ever before. With the powerful, integrated database tools. Includes a complete set of database programming and design tools, allowing developers to build

enterprise-class, data-driven Web applications within a single, integrated IDE. Furthermore full-featured, standards-based team development. Specifically designed to meet the unique challenges of team-based Web development.

2.12.2 Microsoft FrontPage 2000

With the Web site creation and management tool gives users everything they need to easily create and manage great Web sites. FrontPage 2000 allows users to easily create great-looking Web sites exactly the way they want. They can give their Web site a professional and consistent look across all pages, import and edit HTML just as they like, and use the latest in Web technology.

Users can easily update sites and quickly and flexibly manage Internet or intranet Web sites. Users can set up and maintain their site, easily monitor the condition of their Web site, and make updates. Besides, FrontPage 2000 allows users to work together with Microsoft Office to save time. FrontPage 2000 was designed to function more like Microsoft Office so that users can get up and running with FrontPage more quickly than ever.

☑ **Advantages**

FrontPage 2000 gives users everything they need to create exactly the site they want. It makes site management easy because it automatically fixes hyperlinks when files are renamed or moved. In addition, FrontPage 2000 makes creating a Web site easier than ever. FrontPage shares toolbars, menus, Themes, background spell checking, and Format Painter with Microsoft Office. FrontPage 2000 also makes adding forms and databases into sites easier than ever. FrontPage 2000 is easy to own and maintain because just uses the same installer as Microsoft Office, which provides installation on demand, run from server and the ability to self-repair and also available in 15 languages [26].

2.13 SUMMARY

The results of the research carried out actually gain a lot of knowledge that is very useful in developing of PAMS. Through this survey, I clearly know that situation of the system, what requirements need by MPC, choosing pertinent developing tools in the implementation of the system. These results will be used in the development process of the PAMS. Chapter three will review on the methodology used for the designing and development of PAMS and also functional requirement and non – functional requirement PAMS.

CHAPTER 3: SYSTEM ANALYSIS

System analysis is an important activity when new information systems are being built or the existing one are changed. The most crucial role in this system analysis is to define user requirements. Standish Group Survey in 1995 has reported that the incomplete requirement is the main factor where projects are canceled before they were complete [27]. This shows that wrong determination or incomplete requirements may lead to a myriad of problems. So there are a few methods be used to define requirements. One of them is to carry out literature review. A clearer perception of the requirements of athlete system management is known well after the literature review. Studied also done on the current existing system. Any ambiguities of the current existing system are approached to obtain valuable advice and up to date information. Through the studied on the current system, weaknesses will also be recognized and system enhancement will more emphasize on their weaknesses.

Besides, identify the methodology to be use in develop the system is also an important steps need to go through. Methodology can be defined as set of coherent used in a several complex activities when developing a systems. The best way to determine a methodology used is to have a systematic convention for analysis and designing the system's information.

3.1 METHODOLOGY

Identify methodology will be used in developing system is very crucial. It acts as guidance for the developer to accomplish the system in a sequence of phases. Each phase is itself a process or collection of process that can be described as a set of activities. Developer will develop the system by complete each activities of phase before continue to the next phase. Develop the system with phase-by-phase will make the system development more systematic, consistency and controllable. Usually, system development involves the following phases (activities):

- Requirements analysis and definition

  This is a first step to meet with the customer to determine the requirement of the system, which is going to develop. Without knowing the boundary, the entities and the activities, it is impossible to describe the system and how it will interact with its environment.

- System design

  In this phase is to create a system design after the requirements are defined. It is to meet the specified requirements. Besides, the system design shows the customer what the system look like from the customer's perspective.

- Program design

  In this phase is to approve the design from the customer. Then the overall system design is used to generate the designs of the individual program of the system.

- Writing the program or program implementation

  This phase is to write the program for the whole system when system designs are approved.

- Unit testing

  This phase is testing the program have been written, the programs will be tested as individual pieces of code before they can be integrated together.

- Integration testing

  This phase is to integrate together the pieces of programs that have been correctly tested. This is to make sure that the whole program can work properly after joined with others.

- System testing

  This is a final testing phase which involves a test of the whole system to make sure that the functions and interactions specified initially have been implemented properly and also compare with the specified requirements.

- System delivery

  This phase is to delivery the final product or the whole system. As it is used, discrepancies and problems are covered.

- Maintenance

  This phase is to maintain the system to avoid anything that goes wrong with the system or needs any requirement changes.

Each phase or process can be described in a variety of ways such as using text, picture or a combination. Software engineering researchers have suggested a variety of formats usually organized as a model that contains key process features [28]. There are some models which is describes in software engineering are using in system development such as waterfall model, waterfall model with prototyping, V model and so on.

3.1.1 Why V Model

The V model is chosen in developing PAMS. It is because V model is a variation of the waterfall model that demonstrated how the testing activities related to analysis and design [28]. The V model depicted in figure 3.1, which is coding form as the point of the V, with analysis and design on the left, testing and maintenance on the right. Unit and integration testing addresses the correctness of program.

The V model suggests that unit and integration testing also be used to verify the program design. That is, during unit and integration testing, the coders, testers and quality assurance team members should ensure that all aspects of the program design

have been implemented correctly in the code. Similarly, system testing should verify the system design, making sure that all system design aspects are correctly implemented. Acceptance testing, which is conducted by associating a testing step with each element of the specification; this type of testing checks to see that all requirements have been fully implemented before the system is accepted and pair for.

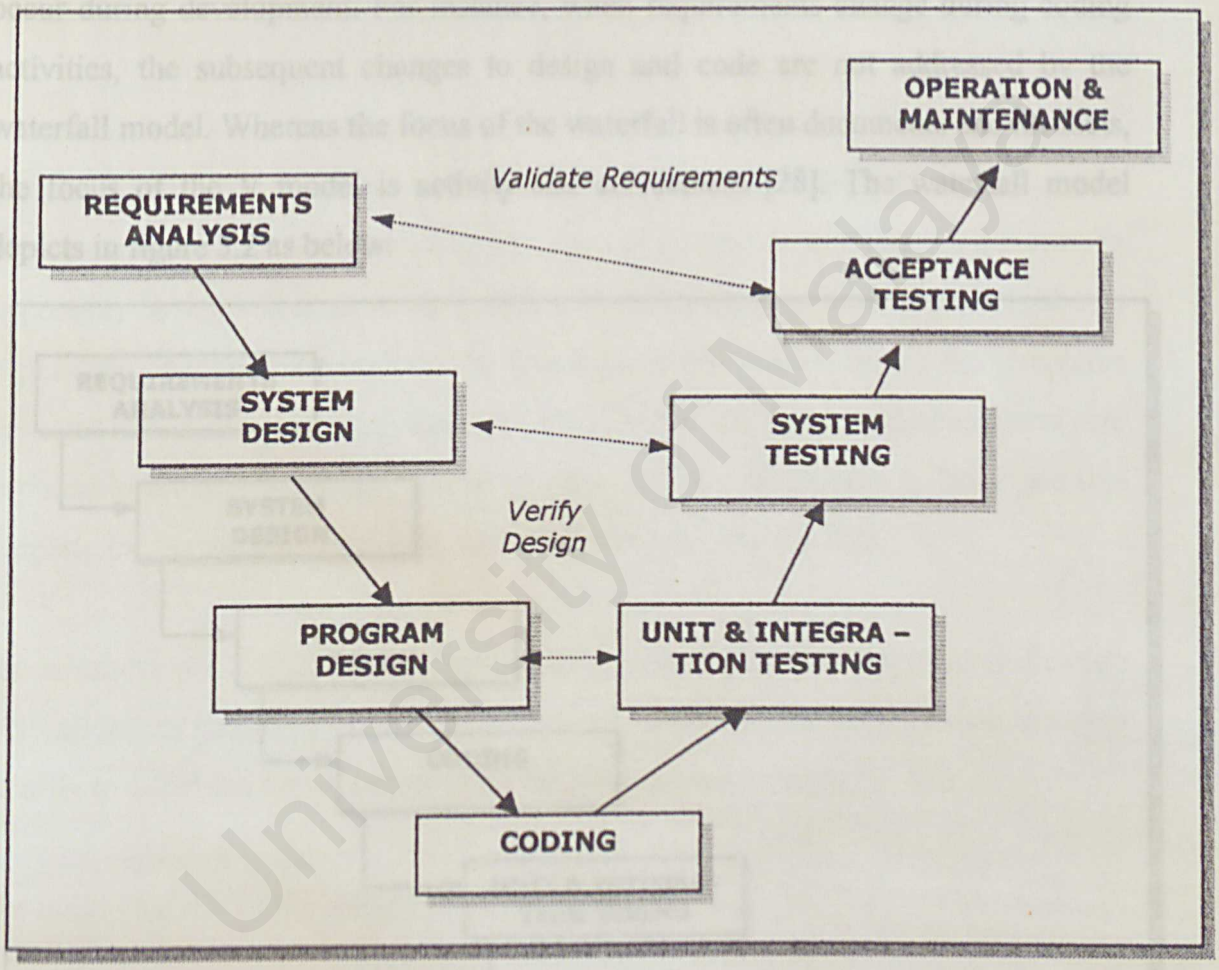


Figure 3.1 The V Model

3.1.2 V Model Versus Waterfall Model

The model's linkage of the left side with the right side of the V implies that if problems are found during verification and validation, then the left side of the V can be re-executed to fix and improve the requirement, design, and code before the

testing steps on the right side are reenacted. In other words, the V model makes more explicit some of the iteration and rework that are hidden in the waterfall depiction.

Model waterfall is no insight into how each activity transforms one artifact to another such as requirements to design. Thus, the model provides no guidance to developers on how to handle changes to products and activities that are likely to occur during development. For instance, when requirements change during coding activities, the subsequent changes to design and code are not addressed by the waterfall model. Whereas the focus of the waterfall is often documents and artifacts, the focus of the V model is activity and correctness [28]. The waterfall model depicts in figure 3.2 as below:

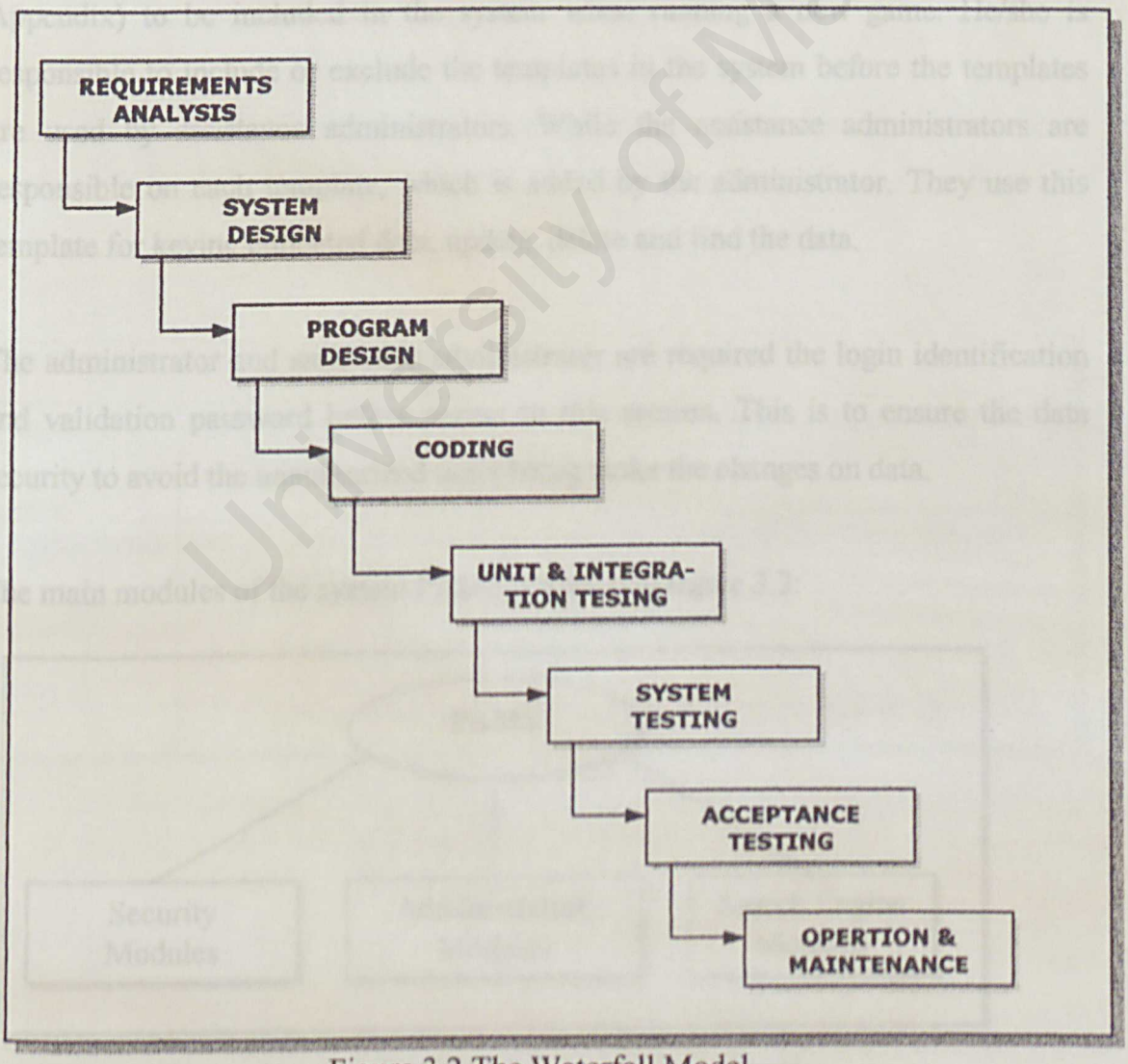


Figure 3.2 The Waterfall Model

3.2 SYSTEM MODEL

PAMS is divided into two main sections, which are general user section and administration section. Each section consists of several main modules and sub – modules. This is to ensure that the system is modularity. For instance, general user section has search engine main module, which is allowing the user to retrieve and search on data. While the administration section have administration and security main module such as authentication sub – module.

In the administration section, there have divided into two types of administrator, there are administrator and assistance administrator. Super administrator is a person to create a new game and determine the types of templates (is a form and shown in Appendix) to be included in the system when running a new game. He/she is responsible to include or exclude the templates in the system before the templates are used by assistance administrators. While the assistance administrators are responsible on each template, which is added by the administrator. They use this template for keying collected data, update, delete and find the data.

The administrator and assistance administrator are required the login identification and validation password before access to this section. This is to ensure the data security to avoid the unauthorized users being make the changes on data.

The main modules of the system PAMS is shown in figure 3.3:

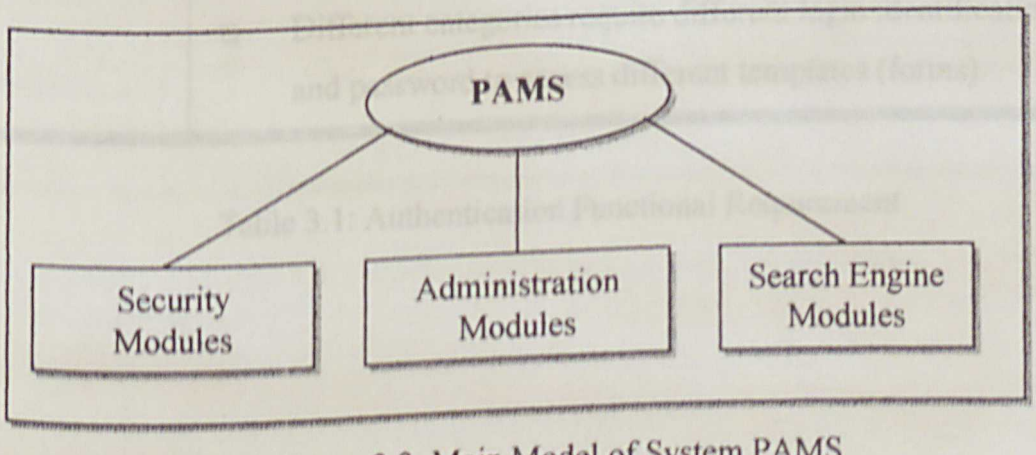


Figure 3.3: Main Model of System PAMS

3.3 FUNCTIONAL REQUIREMENTS

A functional requirement describes an interaction between the system and its environment. There are three types of requirements: requirements that absolutely must be met, requirements that are highly desirable but not necessary and requirements that are possible but could be eliminated. The development of PAMS is focused on the first and second type of the requirements.

The requirements for each module are categorized into two main sections there are administration section and general user section.

3.3.1 Administration Section

3.3.1.1 Security Module

This main module consists of authentication sub – module. Security module is to provide the system secure from unauthorized user being access to the administrator section and to avoid the data loosing.

Sub - Module	Authentication
Usage	Improving the security of the system by restricting unauthorized user access to the administrator section.
Requirements	▫ Login identification and validation password are required when access to administrator section. ▫ Different categories require different login identification and password to access different templates (forms).

Table 3.1: Authentication Functional Requirement

3.3.1.2 Administration Module

In the perspective of system administration, there are two types of administrator: super administrator and assistance administrator. Super administrator is responsible to create folder for a new game and determine usage templates (forms) either be included or excluded in the system. Then, the assistance administrators will use the templates, which are determined by the administrator.

Super Administrator

Sub - Module	Create Game
Usage	Create new folder for a new game and determine which templates (forms) will be used in the management of game by including or excluding the templates from database.
Requirement	▫ Each added templates have their own ID respectively.

Table 3.2: Template Functional Requirement

Assistance Administrator

Sub –Module	Athlete Biography
Usage	Athlete's biography will be keyed in into the database through the template. Allow the administrator to retrieve the information of athlete biography.
Requirement	▫ Add, delete, update and find functions are provided for manage the entry data.

Table 3.3: Athlete Biography Functional Requirement

Sub –Module	Game Village
Usage	Game Village of athletes are determined will be keyed in into the database through the template. Allow the administrator to retrieve the information of athlete accommodation and food.
Requirement	▫ Add, delete, update and find functions are provided for manage the entry data.

Table 3.4: Game Village Functional Requirement

Sub –Module	Result Performance
Usage	Result performance of the athlete for each event will be keyed in into the database through the template. Allow the administrator to retrieve the result of athlete performance.
Requirement	▫ Add, delete, update and find functions are provided for managing the entry data

Table 3.5: Result Performance Functional Requirement

Sub –Module	Transportation
Usage	Transportation is determined for the athletes arrival, departure to or from competition arena, practice venue and so on will be keyed in into the database through the template. Allow the administrator to retrieve the information of athlete transportation.
Requirement	▫ Add, delete, update and find functions are provided for manage the entry data.

Table 3.6: Transportation Functional Requirement

3.3.2 General User Section

In the perspective of users, they are refer to non – admin staffs. They are only allowed to retrieve the information from the database but forbidden to modify the data in the database.

Module	Search Engine
Usage	Allow the user to search for information in the database PAMS. There are three alternatives to search on data by using this search engine such as search by athlete's name, by country and by sport. In the each categories. The search result also can be sort by athlete' name.
Requirement	▫ User-friendly interface to let user easy to use. ▫ Able to display a result in a systematic and effective ways.

Table3.7: Search Engine Functional Requirement

3.4 NON – FUNCTIONAL REQUIREMENTS

A non – functional requirement describes a restriction on the system that limits the choices for constructing a solution to the problem. It is also known as a constraint. Non – functional requirements are essential definition of the system properties and constraints under which a system must operate. Although there are very subjective, but there are as important as functional requirements.

3.4.1 Reliability

A system is said to have reliability if it does not produce dangerous or costly failures when it is used in a reasonable manner. That is, in a manner that a typical user expects is normal. This definition recognizes that a system may not always be used in the ways that the designer expects.

3.4.2 Robustness

Robustness refers to the quality that causes a system to be able to handle or at least avoid disaster in the face of unexpected data. The Paralympic Athlete Management System (PAMS) support robustness by developing program logic to process anticipated errors in the input. When an error is detected, an error message will be prompted for re – entry before any further processing is carried out. This error message will explain the type of error and the necessary correction(s) to be made. For example, when a user does not key in value for a mandatory field, an error message will be prompted and the value of mandatory will asked to key in value before further process.

3.4.3 Correctness

Correctness includes trace ability, completeness and consistency. The logic of the system must be able to be traced. In this system, comments are written in the scripts. In addition, performance of this system should be consistence and stable. This system will also check the user authorization and authentication.

3.4.4 Modularity

Modularity is a key principal in ensuring good program design. The system workings were broken into modules so that distinct function is isolated from one another. They are useable in any of the full or partially programs in other similar application. PAMS is divided into 4 modules. So the characteristic of this will ease for further enhancements and modification.

3.4.5 Maintainability

This system should be easily to be maintained, simplicity and effective. To reduce manpower involvement, templates are provided for administrators to manage this system.

3.4.6 User Friendly

PAMS has provided a frame (toolbar) whenever user is and ease the user to access to any part of the system. The pages comprise of toolbar and a tab – style menu to all functions in a orderly manner. Besides, a user can also browse PAMS easily by clicking icons. A simple language icon is used for a better understanding of the function. For example, login icon is for users to login before they can access to the administrator and assistance side. Color buttons and descriptive labels also help in providing sufficient information to the user. The PAMS also displays error messages and other confirmation windows to aid the user tasks.

3.4.7 Security

The login module efficiently prevents unauthorized users from accessing the system by requiring correct login names and passwords. For instance, users from the administration level are allowed access to administration side by key in the correct login names and password. Others user from staff level are not given such access. They only allowed retrieve the data from the database without make any modification on data in database.

3.5 PLATFORM CONSIDERATION

Windows 2000 Professional will be chosen as a platform for developing PAMS. This operating system is chosen because built on Window NT® technology and easy - to – use, familiar with Window® 98 user interface. Besides, Window 2000 Professional also integrated with Web capabilities enable to connect to the Internet from anywhere, at any time can access to host of flexible, cost – effective communication options. In administrative aspects, reliability and manageability enhancements will make the desktop management simpler and more efficient. Below are several reasons why Window 2000 Professional is chosen:

- **Manageability**

  Easier to deploy, manage, and support. Centralized management utilities, troubleshooting tools, and support for self-healing applications all make it simpler for administrators and users to deploy and manage desktop.

- **Performance**

  The advancements are accentuated on the operating system's speed. Windows 2000 was 27 percent faster than Windows 98. It is also significantly faster than Windows NT 4.0 on configurations with 32 MB of RAM.

- **Security**

  Provide comprehensive security features to protect sensitive data, both locally on desktop computer and as it is transmitted over local area network, phone lines, or the Internet. Its also support for Internet-standard security features such as IP Security, Layer 2 Tunneling Protocol, and Virtual Private Networking.

- **Usability**

  Combines the power and security of its predecessor, Windows NT Workstation, with the traditional ease of use of Windows 98. It also provides more wizards, a centralized location for common tasks, and menus that adapt to the work.

3.6 WEB SERVER CONSIDERATION

Internet Information Server (IIS) 5.0 will be chosen as a web server in developing PAMS. It is because IIS 5.0 is more naturally integrated with the Window 2000 operating system. In addition, Windows 2000 also distributed IIS 5.0 as its own web server software, so that the web server is already available inside the Window 2000 and will make it fully integrated into the operating system.

3.7 PROGRAMMING LANGUAGE AND COMPONENT CONSIDERATION

Active Server Page 3.0 (ASP) will be chosen as a programming language for coding system. ASP is a great tool for creating dynamic web pages. Besides the programming code is written will generate to the HTML for the web page dynamically. In addition, the ASP code is only processed at that time in the web server when the user browses to that web site or request that ASP page.

The power of the ASP can see from two facts: first, the HTML is not created until the user wants to see the web page. Second, it doesn't care what web browser is being used. ASP is different from many web publishing technologies in the following respects: while ASP must be executed on a computer that supports it, we can view ASP – driven web pages from any computer and with any modern browser. This enables the developers to enhance their web pages with the interactive features.

ASP is relatively simple to learn and able support the scripting language such as JavaScript and VBScript. VBScript will also be used with the ASP to develop the PAMS.

3.8 DEVELOPMENT TOOL CONSIDERATION

Microsoft Visual InterDev® 6.0 will be chosen as a development tool for developing PAMS. This development is chosen because with the features integrated WYSISWG editor for ASP and Dynamic HTML pages, enhanced database programming tools, and end – to – end debugging facilities for multi – tier application built with HTML and scripting language. There are some advantages of using this development tool:

- Rapid end-to-end Web application development. Allows professional developers to design, build, debug, and deploy cross-platform HTML + Script based Web applications faster than ever before.

- Powerful, integrated database tools and makes it very easy to set up database combining ASP and SQL Server.

3.9 DATABASE IMPLEMENTATION CONSIDERATION

Microsoft SQL Server 7.0 will be chosen as a database implementation in the PAMS system. They reason why SQL Server 7.0 is chosen are:

- It is scalability since PAMS needs to store a large amount of data. SQL Server has the capability to manage a large amount of data in a multi – user environment.
- It delivers data in a high performance running in the Window 2000 professional operating system.
- It has a lot of security consideration compared to Microsoft Access 2000.

3.10 HARDWARE AND SOFTWARE REQUIREMENTS

3.10.1 Server Side

A minimum of 64 MB of RAM is suggested for Window 2000 Professional, but 128 MB of RAM is more ideal. Besides, machine should aim at least a 233 MHz processor. Implementation of SQL Server in a production environment on anything greater than a Pentium 200 is recommended. It is because the faster of the processor speed and more memory the web server has, the better performance will be. Network Interface Card (NIC) and network connection with recommended bandwidth at 10 Mbps or more, a hard disk for at least 1 GB of storage and others standard computer peripherals are also required.

To host and run the system, the server computer needs to have various supporting software installed.

Software / Component	Description
Windows 2000 Professional	Network operating system
Internet Information Server 5.0	Web – Server service
Active Server Pages 3.0 (ASP)	Server – Scripting Engine

Microsoft SQL Server 7.0	RDBMS for data warehousing
Microsoft Internet Explorer 5.0 or above	Precondition for ASP installation

Table 3.8 Server Software Requirements

3.10.2 Client Side

The client hardware requirements are quite minimal as long as it has reasonable amount of RAM and a reasonable quality dial – up connection line. The recommended configurations are:

- At least 32 Megabytes of RAM
- A minimum 150 MB of hard disk storage
- Network connection through existing network configuration
- Other standard computer peripherals

Client needs to have the basic Microsoft operating system such as Windows 3x or Window 95 as a basic requirement to install other software to support the system. As for compatibility reason, Microsoft products are recommended. The client software requirements fall on the browser used by users. It requires a system that can run Microsoft Internet Explorer 4.0 and above or any others browsers that support VBScript.

3.11 SUMMARY

This chapter has explains method of approach take to develop the PAMS and also the functional requirements are included in the system. Besides, the software and hardware requirements of the system also are determined. The next chapter will review on the system design, which is including system architecture design, process design, user interface design and also database design.

CHAPTER 4: SYSTEM DESIGN

System design is a critical part for the whole project. So good design is the key to successful of development of the system. This is a stage in the system development process where the requirements for the system are translated into the system characteristics. A working model is used as guidance to the developer before developing the complete system. There are many stages in the design process as follow:

The stages in the design process are:

- Architectural Design

  The sub – system making up the system an their relationships is identified and documented. In this model, users interact through the use of server – side programs that provide for an enhanced experience.

- Process Design

  Structured design is a process oriented for breaking up a large program into hierarchy chart of modules that result in a computer program, which is easier to implement and maintain.

- User Interface Design

  Services are collected to different components of the system and the interfaces of these components are designed. This enable user interacts with the system.

- Database Design

  The data structures used in the system implementation are designed in detail and specified. In relational database, a table or relation is a collection of unique instances of similar data.

4.1 ARCHITECTURE DESIGN

Paralympic Athlete Management System (PAMS) is implemented based on web-based application as shown in Figure 4.1:

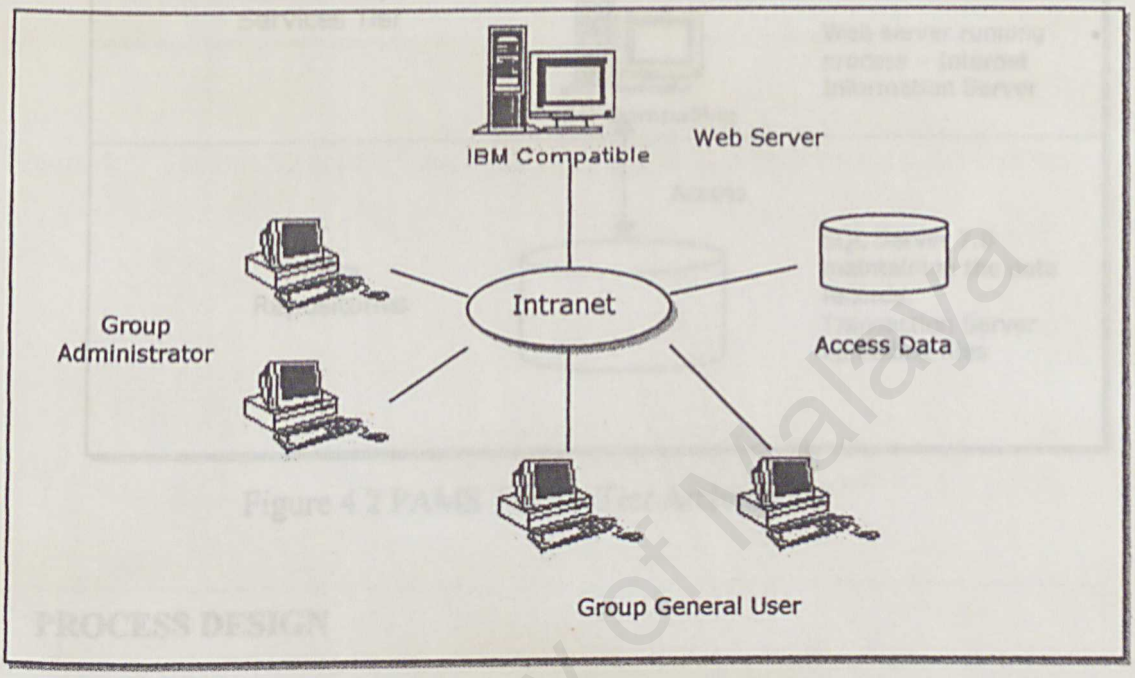


Figure 4.1 Overview of the PAMS Architecture

In the overall system design, the PAMS is designed to be three tiers architecture, which is believed to be more loosely coupled design for the components used. In the PAMS design, the frontier is the presentation / application tier which is an Internet browser and is used to present the human interactive interface to the user. The middle tiers is know as the functionality / service tier. The communication between this tier and the front tier depends on the Hypertext Transfer Protocol (HTTP) for the web page transfer. The tier shown in figure 4.2 is data repository, which is for database management.

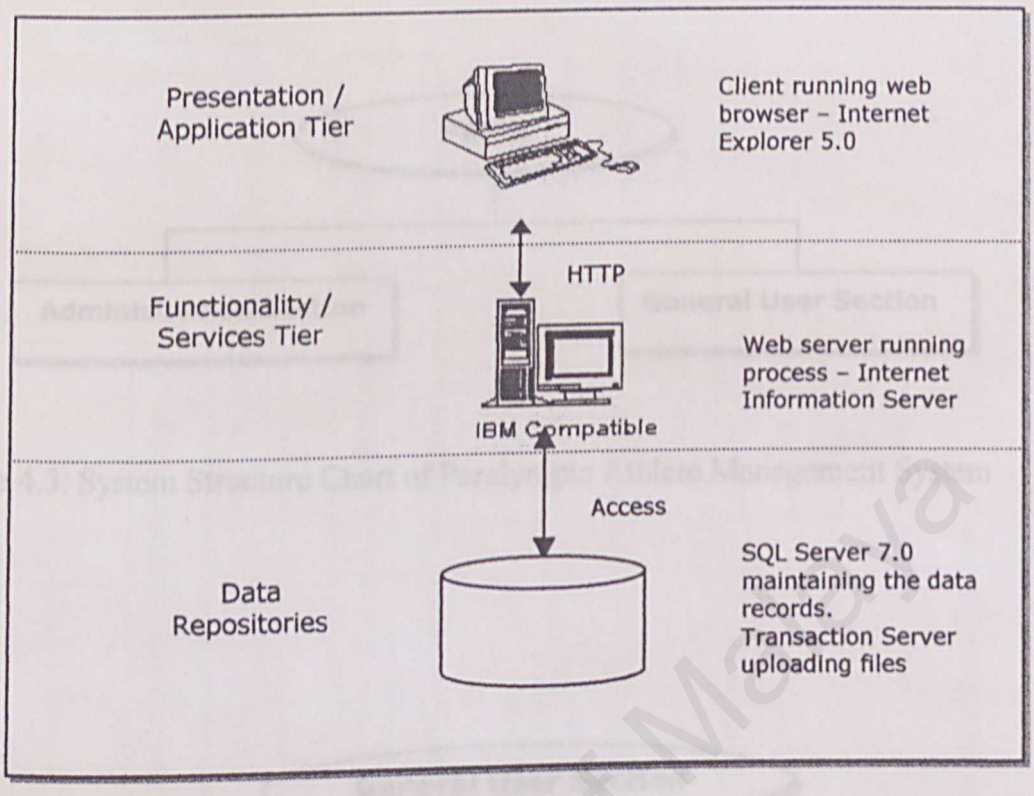


Figure 4.2 PAMS Tier-to-Tier Architecture

4.2 PROCESS DESIGN

The system is structured into a number of principal sub – system where a sub – system is an independent unit. Communication between sub – system are identified.

4.2.1 Structured Chart

Decomposing a system into a set of interacting sub – system an important phase. Structure chart is used to depict the high level extraction of specified system. The usage of structure chart is to describe the interaction between independent sub – systems. PAMS is divided into two sections, which are general users section and administration section. The details of each section is represented in the structure chart as below:

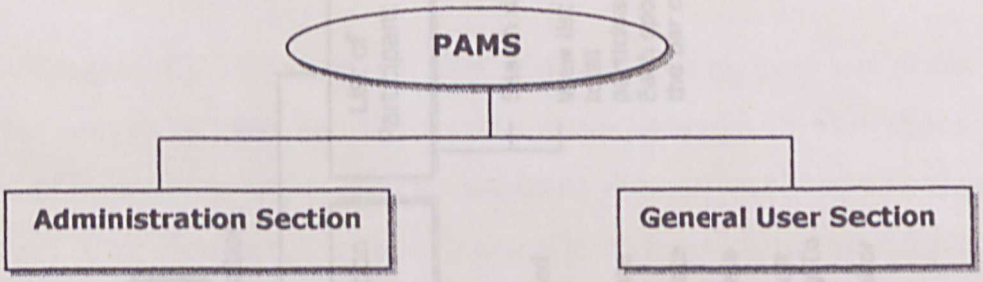


Figure 4.3: System Structure Chart of Paralympic Athlete Management System

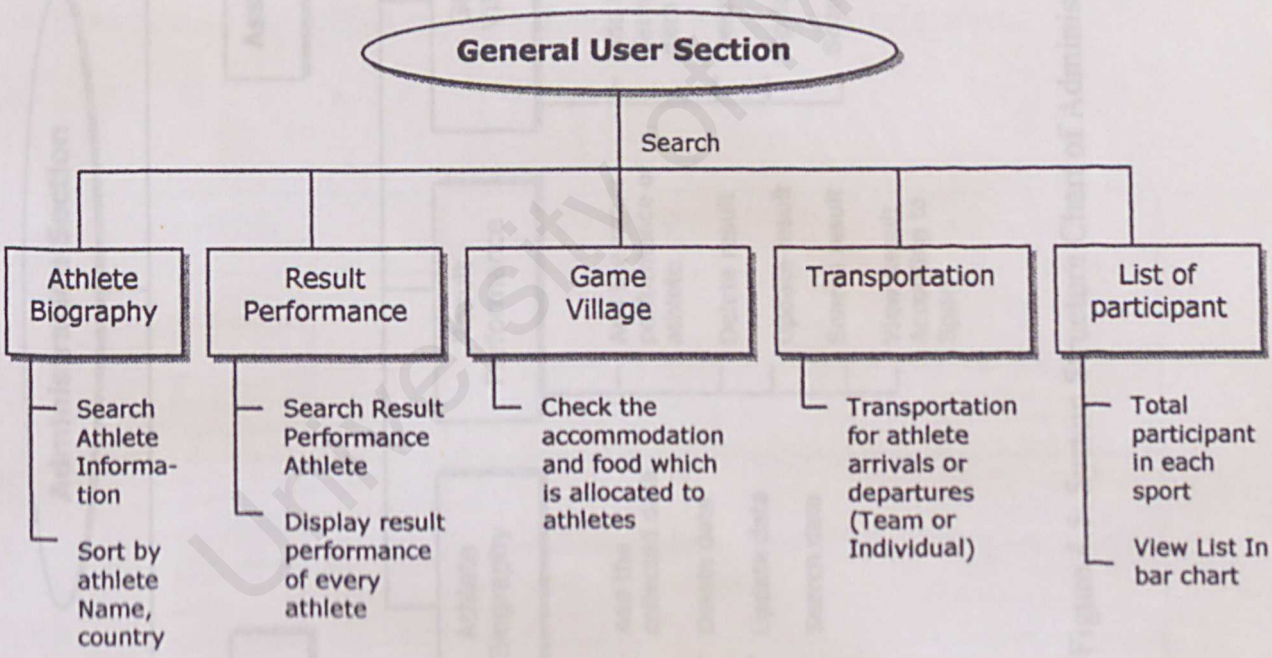


Figure 4.4: System Structure Chart of General User Section

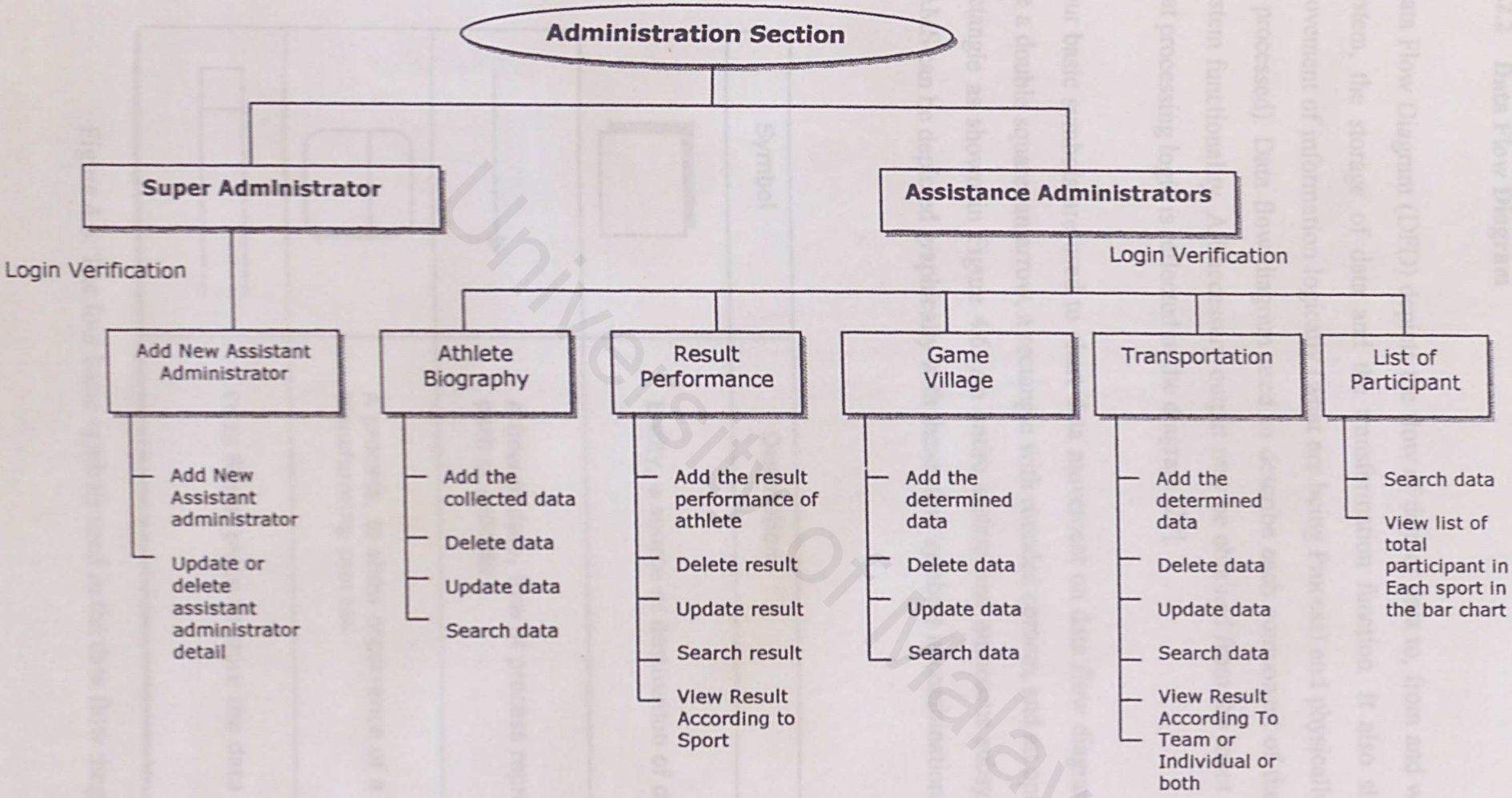


Figure 4.5: System Structure Chart of Administration Section

4.2.2 Data Flow Diagram

Data Flow Diagram (DFD) depicts the flow of data or data to, from and within the system, the storage of data and the transformation function. It also shows the movement of information logically (what are being Process) and physically (how it is processed). Data flow diagram used to describe each component of the process system functionality. All necessary output may be obtained from the input data and that processing logic is reflected in the diagram [29].

Four basic symbols are used to chart data movement on data flow diagrams. They are a double square, an arrow, a rectangle with rounded corners, and an open-ended rectangle as shown in Figure 4.6. An entire system and numerous subsystems of PAMS can be depicted graphically with theses four symbols in combination.

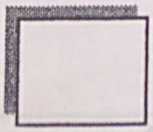
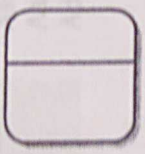
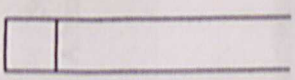
Symbol	Description
	Entity, a source or destination of data
	A flow of data, flow of process represents a path of process
	A process, to show occurrence of a transforming process
	Data Store, place to store the data

Figure 4.6: The four basic symbols used in the data flow diagram

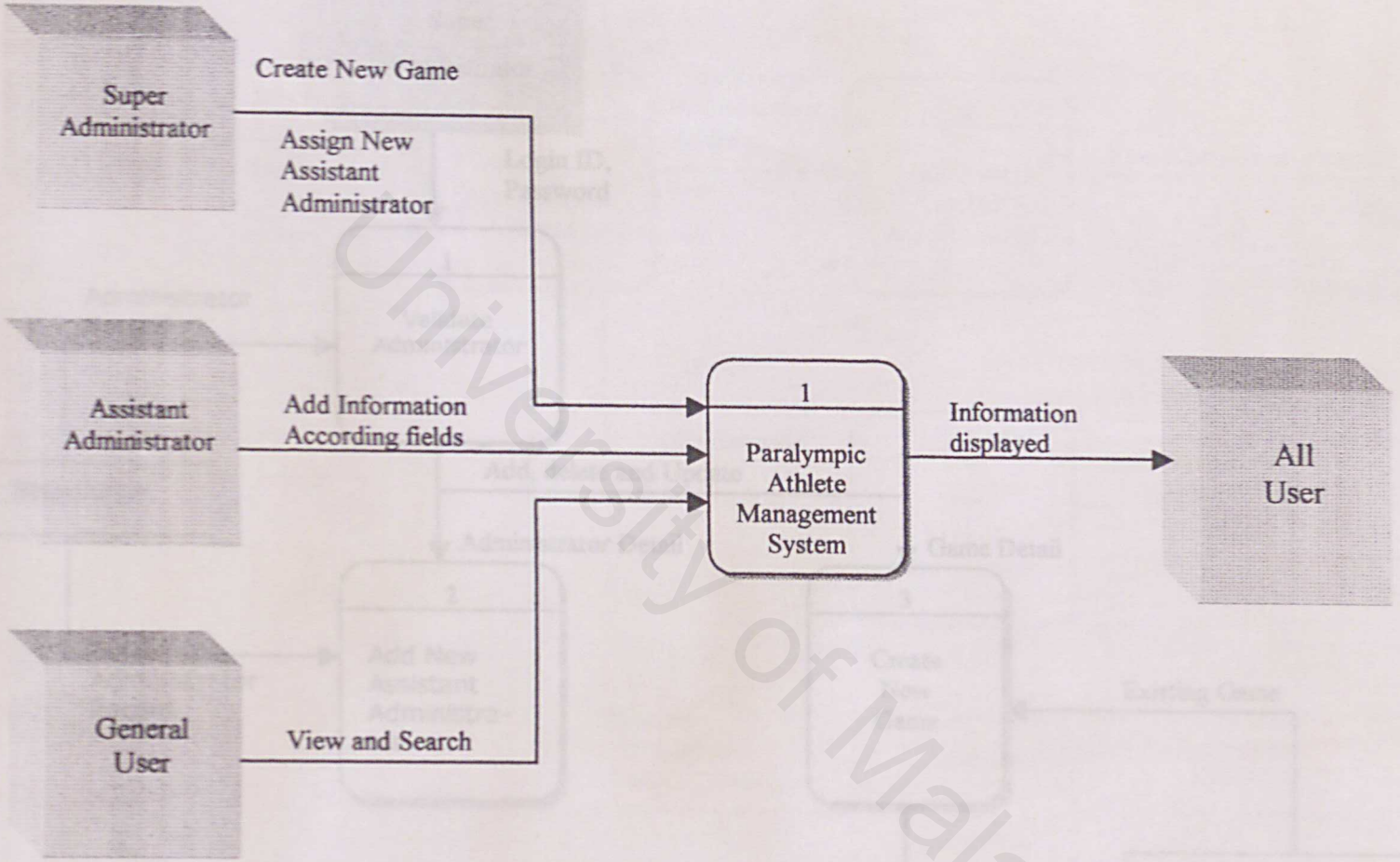


Figure 4.7: Context Diagram of PAMS

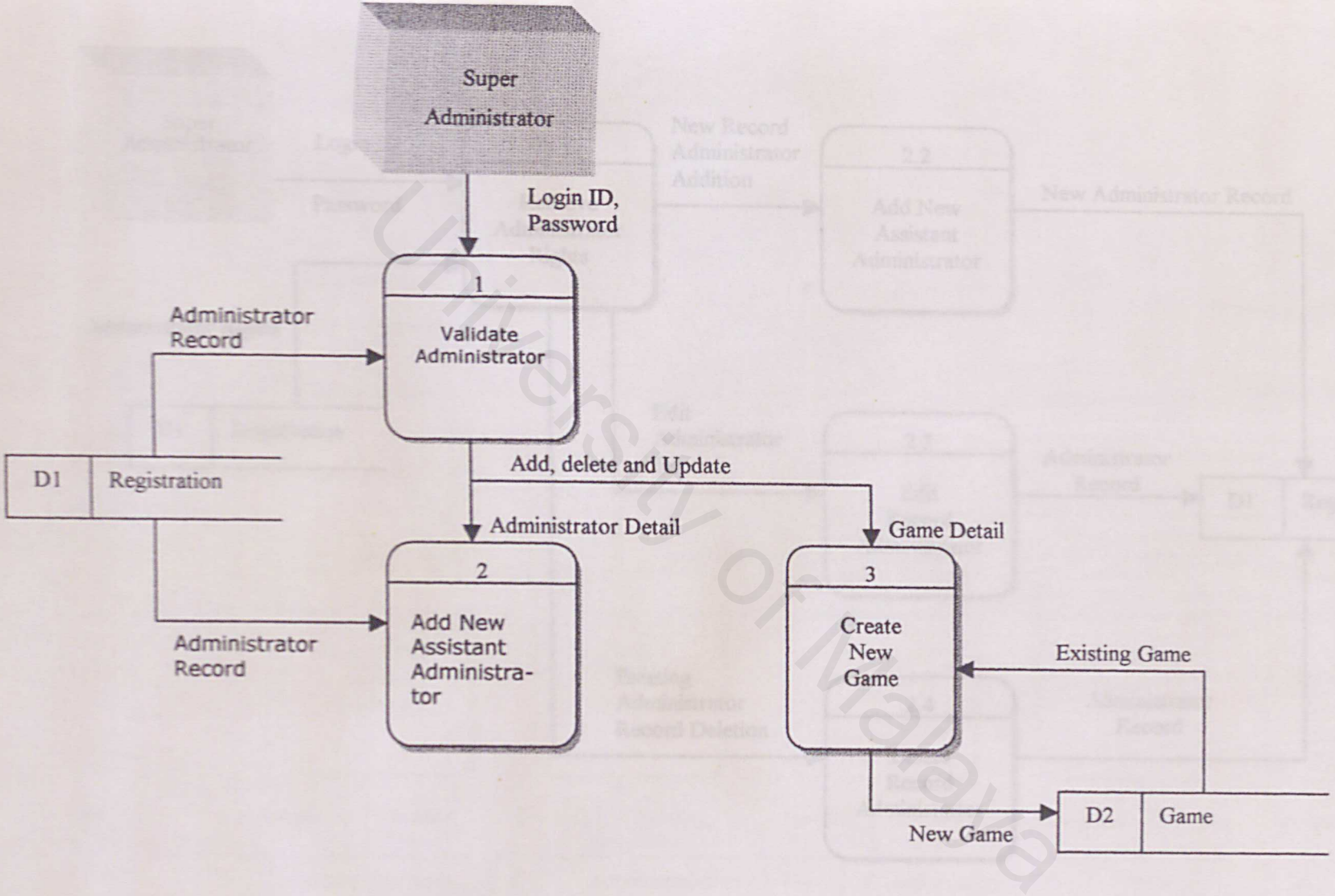


Figure 4.8: Diagram 0 Of Super Administrator

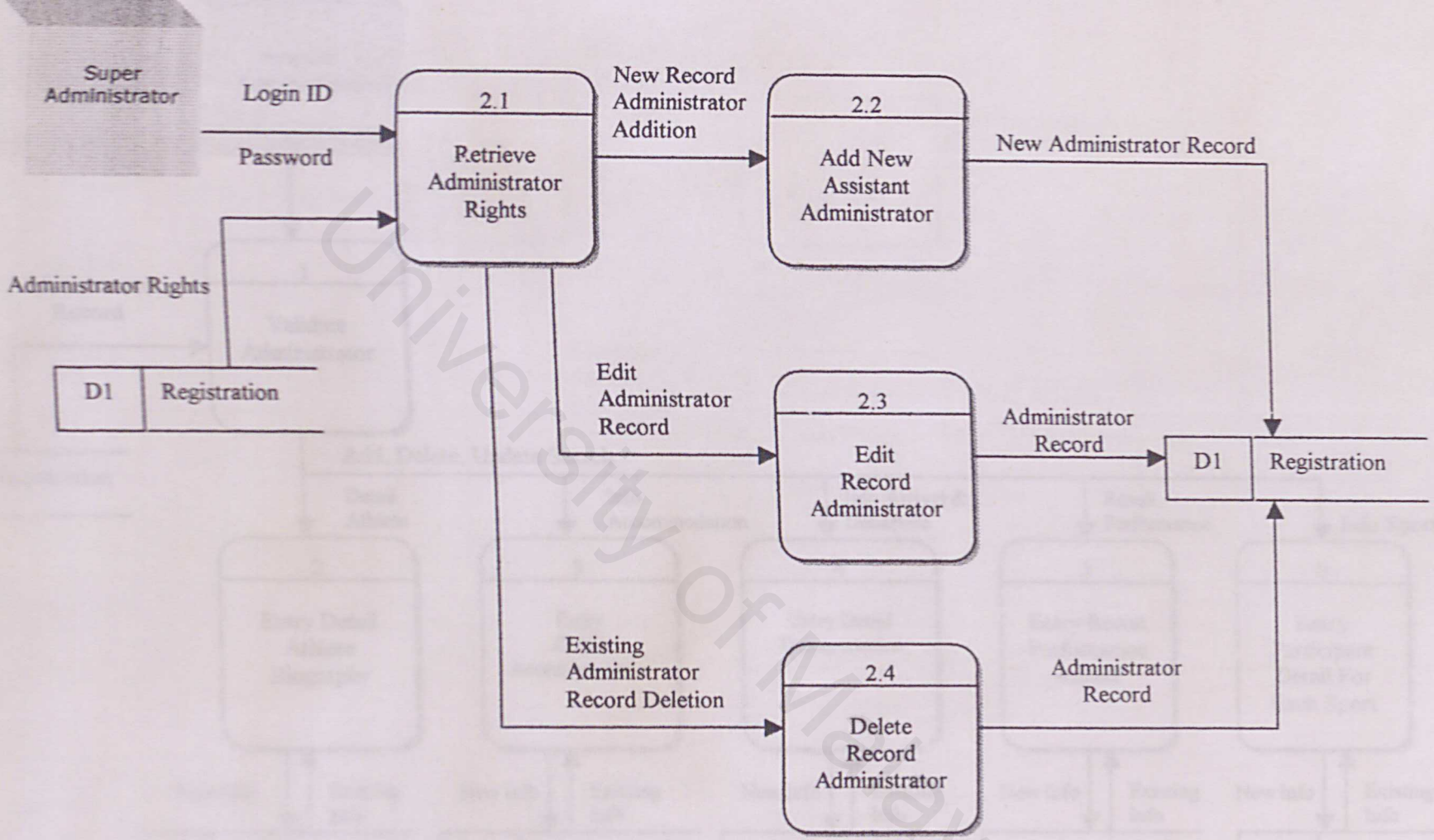


Figure 4.10 The Child Diagram for Administrator Record Changes of Administrator Module

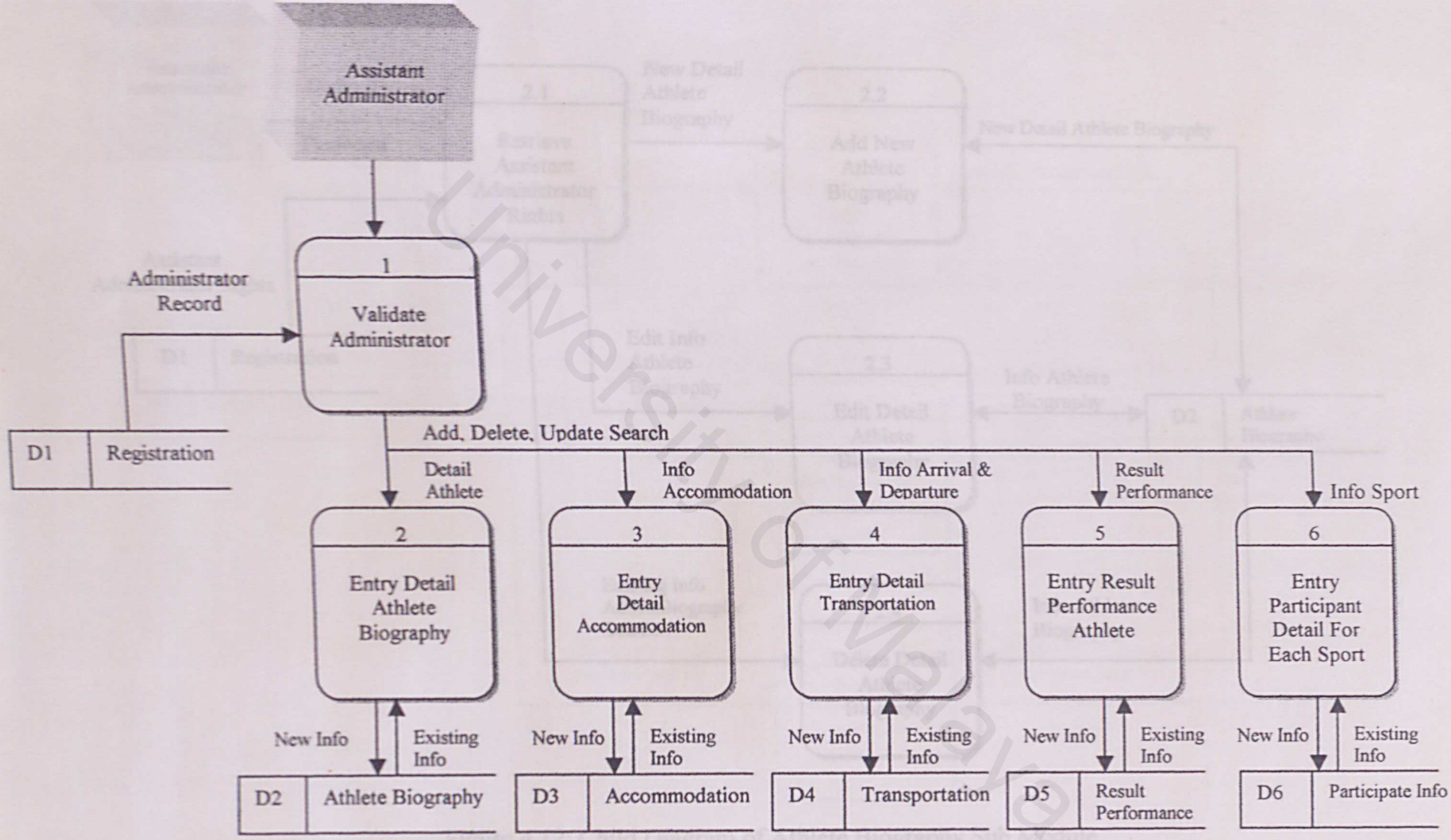


Figure 4.11: Diagram 0 of the Assistant Administrator Module

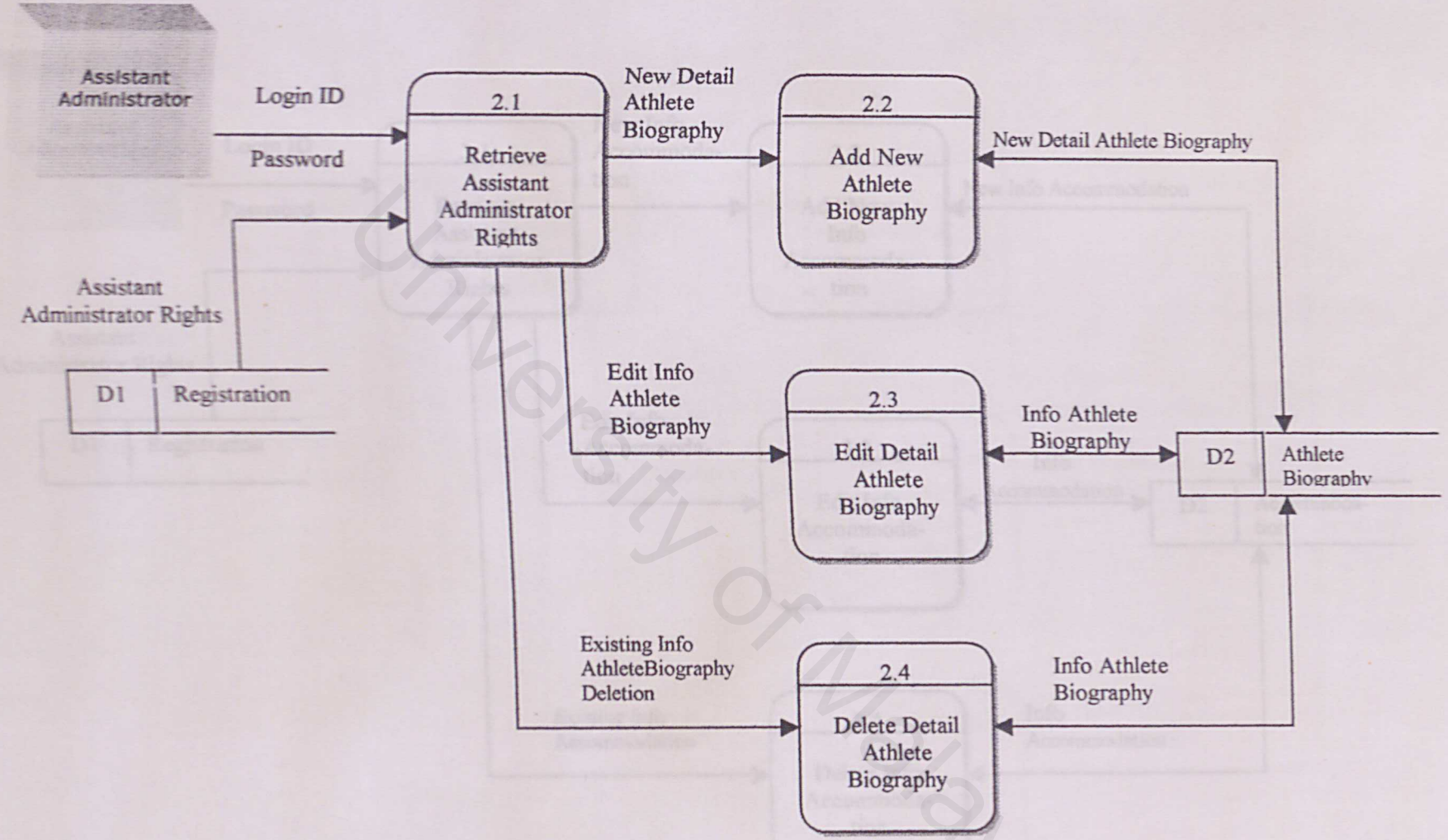


Figure 4.12: Child Diagram of Athlete Biography Sub Module

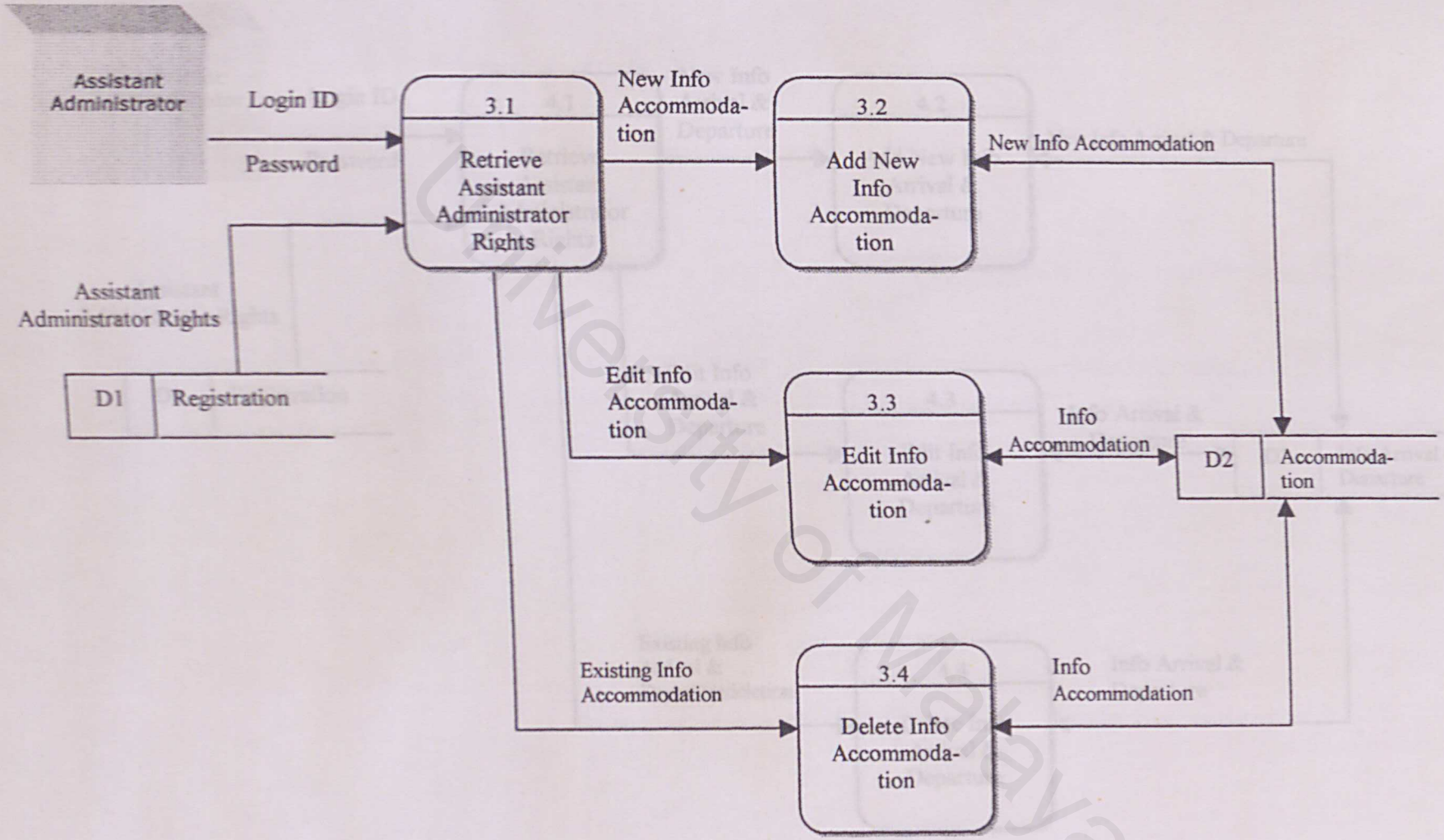


Figure 4.13: Child Diagram of Game Village Sub Module

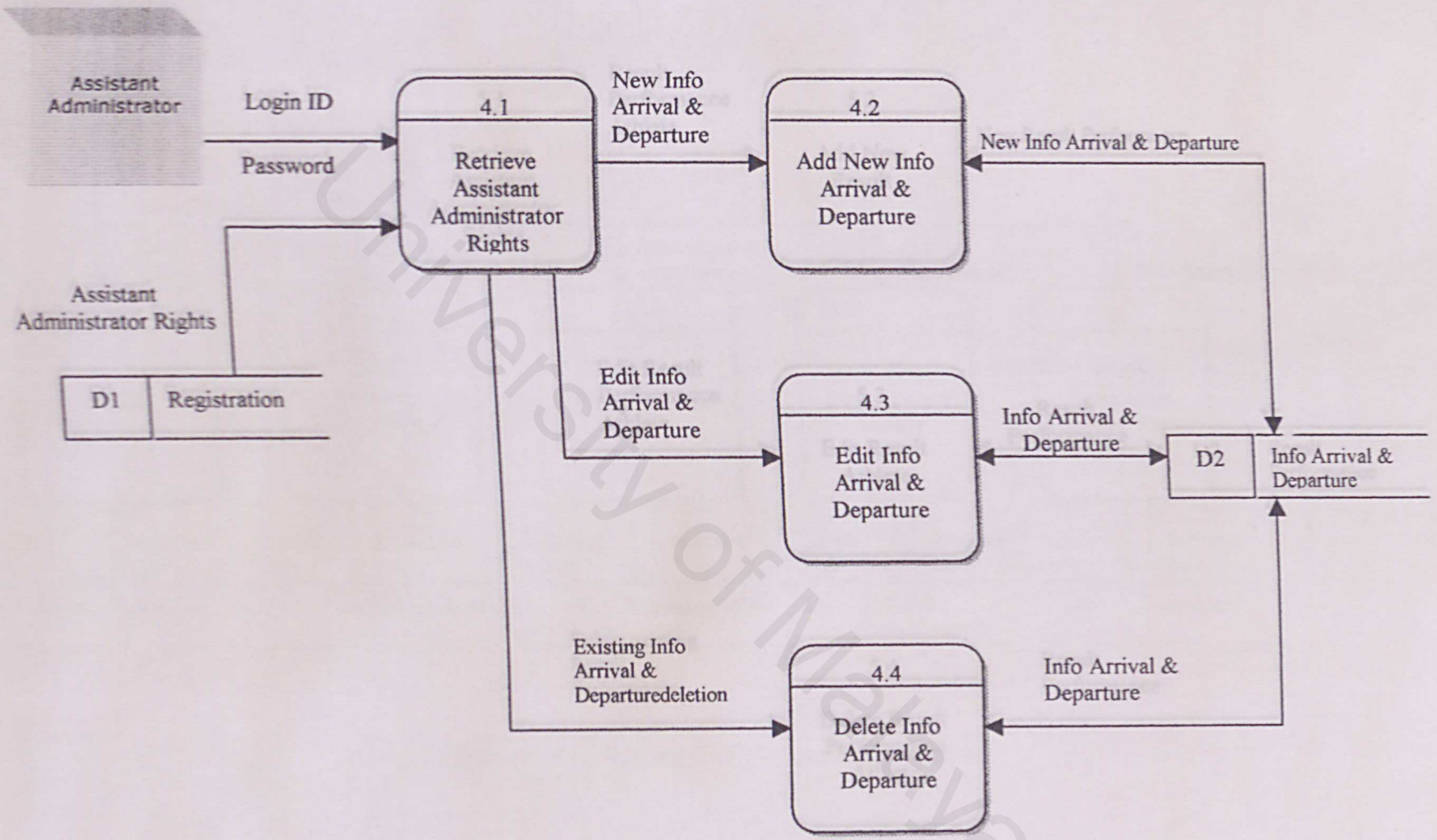


Figure 4.14: Child Diagram of Transportation Sub Module

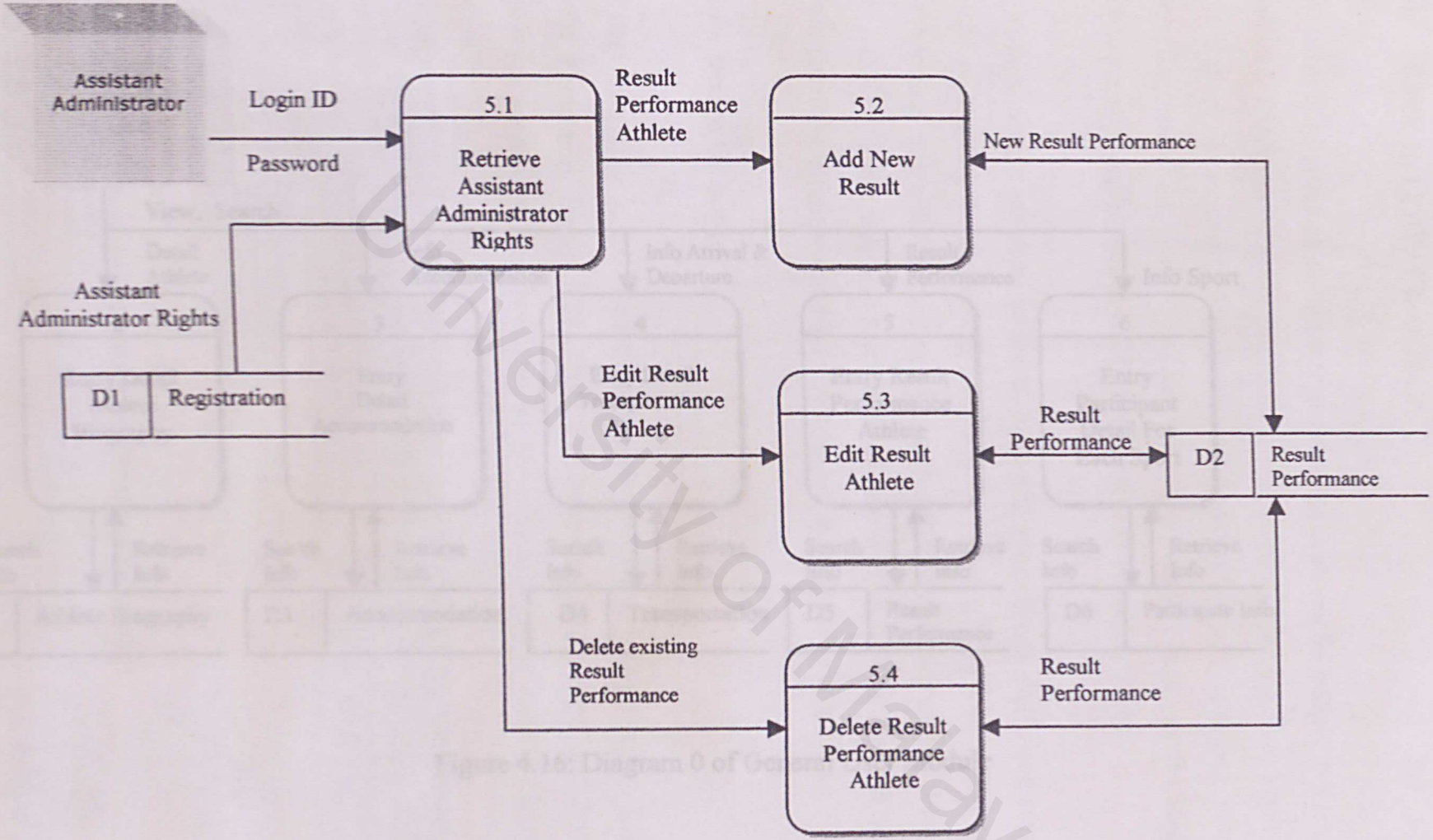


Figure 4.15: Child Diagram of Result Performance Sub Moduel

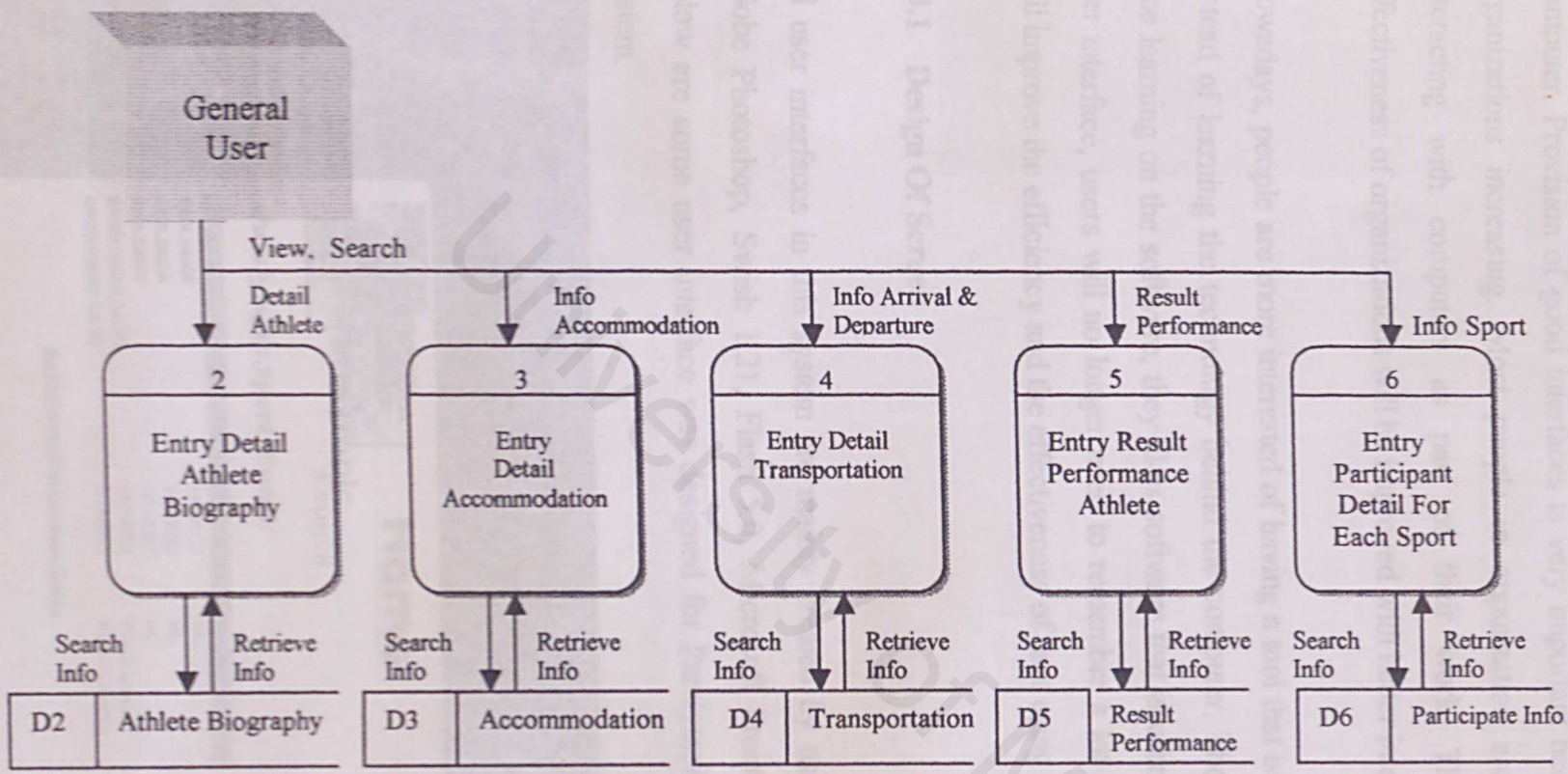


Figure 4.16: Diagram 0 of General User Module

4.3 USER INTERFACE DESIGN

The purpose of interface design is to provide the best way for people to interact with computer. Provision of good interfaces is very important because the impact to the organizations increasing. Most people in organization are spending more time interacting with computers as part of their work. Their performance and effectiveness of organizations will be improved with better interfaces.

Nowadays, people are more interested of having a tool that is simple and easy to use instead of learning the technology behind the computer. They don't want to spend time learning on the software, they likes software that is user- friendly. With a good user interface, users will no longer need to remember a lot of command. Hence, it will improve the efficiency and the effectiveness of user using the system.

4.3.1 Design Of Screen

All user interfaces in this system are mainly created by using Markup Language, Adobe Photoshop, Swish 1.21, Flash 5.0, Microsoft Front Page and JavaScript. Below are some user interface was designed for Paralympic Athlete Management System.

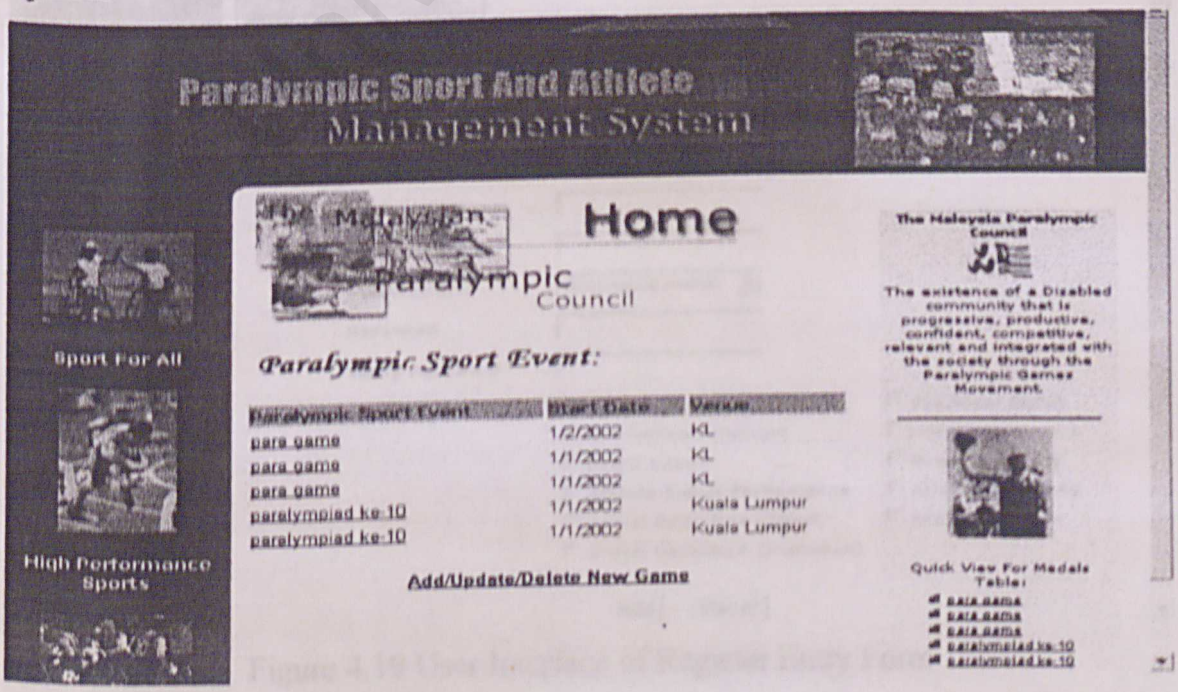


Figure : 4.17 Main Page User Interface of PAMS

The user Interface which is shown on below is a login page. The administrators have to login before access to the certain page.

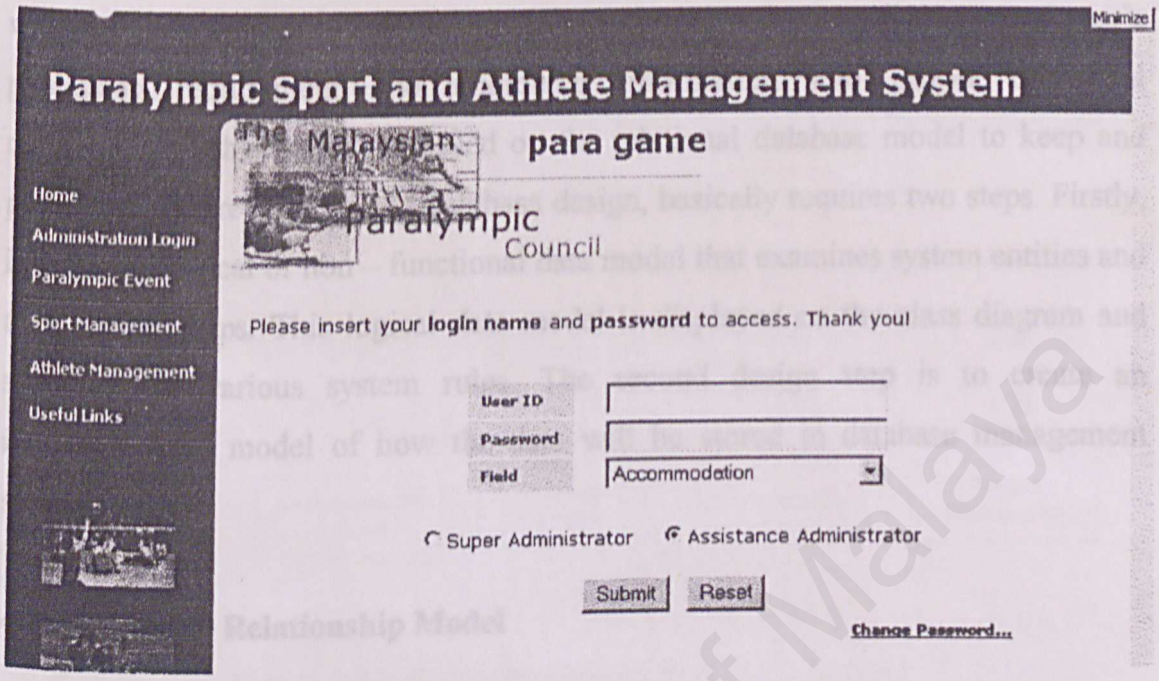


Figure 4.18: User Interface of Login page

The page shown on below is registration page which is used to add new administrator .

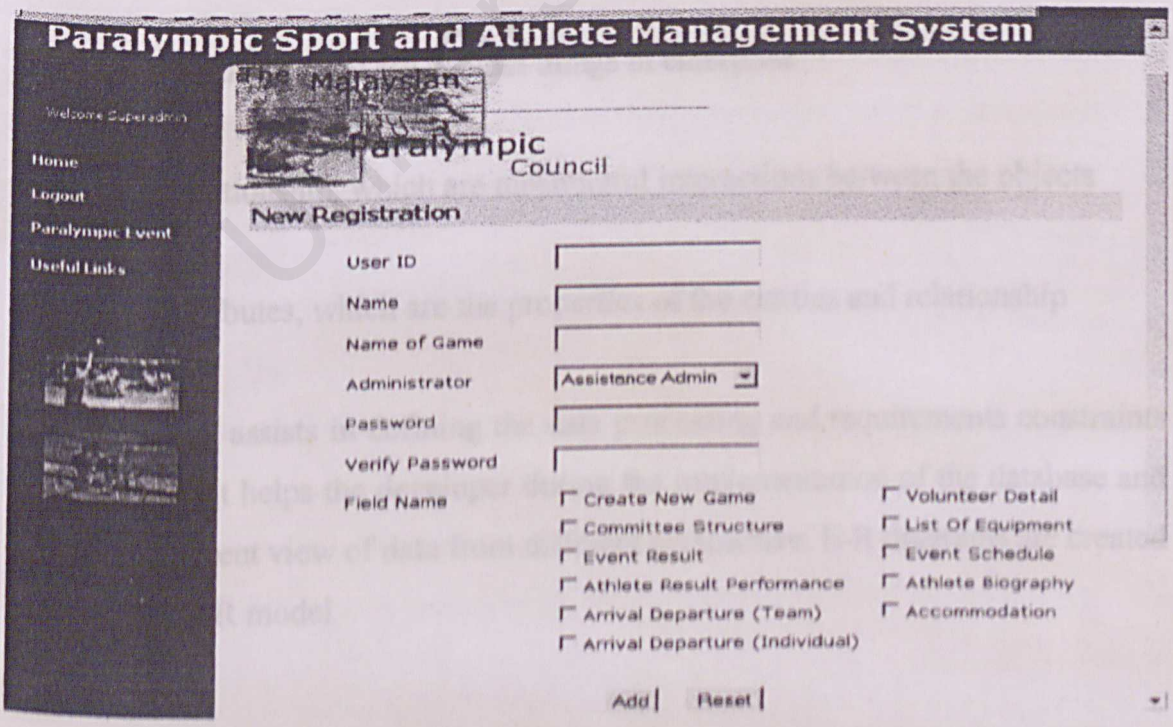


Figure 4.19 User Interface of Register Entry Form

4.4 DATABASE DESIGN

Database design involves the activity on modeling the structure of a database that will store and maintain the data records. It includes the transformation of user's processing requirement and unordered information into proper functional requirements. This system is based on the relational database model to keep and process data or records. In the database design, basically requires two steps. Firstly, is to design logical or non – functional data model that examines system entities and their relationships. This logical data model is displayed on the class diagram and specifies the various system rules. The second design step is to create an implementation model of how the data will be stored in database management system [30].

4.4.1 Entity – Relationship Model

Entity – relationship (E-R) model is a model that represents system data by entity and relationship sets. Entity – relationship analysis uses three major abstracts to describe data. They are:

- Entities, which are distinct things in enterprise
- Relationship, which are meaningful interactions between the objects
- Attributes, which are the properties of the entities and relationship

The E-R model assists in defining the data processing and requirements constraints that lie ahead. It helps the developer during the implementation of the database and interprets different view of data from different perspective. E-R diagrams are created based on the E-R model.

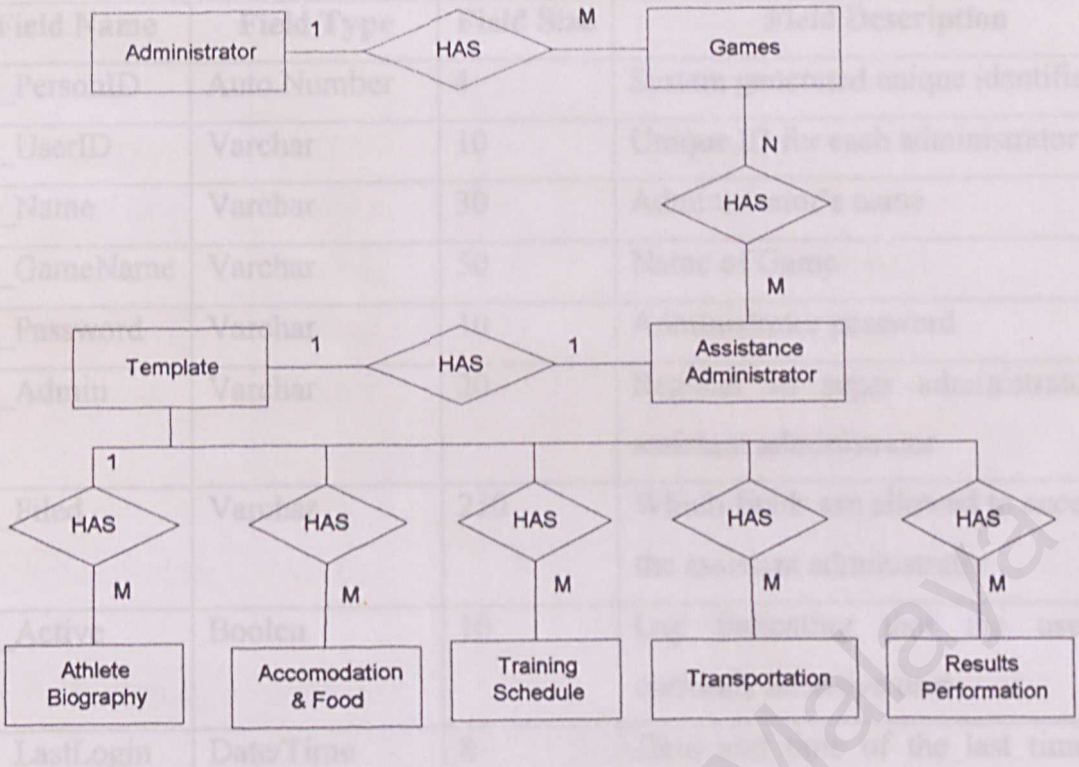


Figure 4.20: Administration Section E-R Diagram.

4.4.2 Data Dictionary

Data dictionary is a specialized application of the kinds of dictionaries used as references in everyday lift. The data dictionary is a reference work of data about data complied by system analysts to guide them through analysis and design. [29]

The database structure in PAMS is listed in the following sections.

4.4.2.1 Registration Table

This table keeps every administrator record (including super administrator who has authority to add, delete, edit records according to the fields they had assigned.)

Field Name	Field Type	Field Size	Field Description
R_PersonID	Auto Number	4	System generated unique identifier
R_UserID	Varchar	10	Unique ID for each administrator
R_Name	Varchar	30	Administrator's name
R_GameName	Varchar	50	Name of Game
R_Password	Varchar	10	Administrator password
R_Admin	Varchar	20	Register as super administrator or assistant administrator
R_Filed	Varchar	250	Which fields are allowed to access by the assistant administrator
R_Active	Boolen	10	Lag indicating that the user us currently an active user
R_LastLogin	Date/Time	8	Date and time of the last time this user logged into the application

Table 4.1 Database Structure of Registration Table

4.4.2.2 Athlete Biography Table

This table is used to store the athlete information for every game. Personal record for each athlete also keeps in this table.

Field Name	Field Type	Field Size	Field Description
ab_AthleteID	Int	4	Unique ID for each Athlete
ab_NewEvent	Varchar	50	Name of game
ab_FamilyName	Varchar	50	Athlete's family Name
ab_GivenName	Varchar	50	Athlete's Given Name
ab_Host	Varchar	50	Country for which athlete competing
ab_Gender	Varchar	10	Male or Female
ab_SportCompete	Varchar	50	Sport compete by the athlete
ab_City	Varchar	20	City of Birth

ab_State	Varchar	20	State of Birth
Ab_Country	Varchar	20	Country of Birth
ab_Category	Varchar	100	Category of disability
ab_Wheelchair	Boolean	8	Wheelchair user
ab_Occupation	Varchar	50	Athlete's occupation
ab_Marital	Varchar	20	Marital status
ab_Represent	Varchar	100	What event had been represented for the country in the international game.
ab_RecordHolder	Varchar	100	Game record holder and record for the event
ab_Performance	Varchar	100	Best result performance for every event
ab_Hobby	Varchar	50	Athlete hobby or interest
ab_Sponsor	Varchar	50	Personal sponsor

Table 4.2 Database Structure of Athlete Biography Table

4.4.2.3 Athletics Table

This table is used to stores the event will participate by athlete under every classification

Field Name	Field Type	Field Size	Field Description
a_AthleteID	Int	4	Unique ID for each athlete
a_NewEvent	Varchar	50	Name of Game
a_Country	Varchar	30	Athlete from which country
a_CountryCode	Varchar	20	Country Code
a_GivenName	Varchar	50	Athlete's GivenName
a_FamilyName	Varchar	50	Athlete's Family Name
a_Gender	Varchar	10	Male or Female
a_Day	Int	4	Day of birth

a_Month	Varchar	10	Month of birth
a_Year	Int	4	Year of birth
a_ICNO	Varchar	20	Identity card number of athlete
a_Passport	Varchar	20	Athlete's passport number
a_Class	Varchar	20	Athlete classification
a_Category	Varchar	100	What category of disability
a_Event1	Varchar	20	Event participated by athlete
a_Event2	Varchar	20	Event participated by athlete
a_Event3	Varchar	20	Event participated by athlete
a_Event4	Varchar	20	Event participated by athlete
a_Event5	Varchar	20	Event participated by athlete
a_Event6	Varchar	20	Event participated by athlete

Table 4.3 Database Structure of Athletics Table

4.4.2.4 Arrival & Departure (Individual) Table

This table is used to store the information athletes or delegate who reach individually. Keeps information about the arrival and departure date, time and transportation.

Field Name	Field Type	Field Size	Field Description
ti_Country	Varchar	30	Country Name
ti_CountryCode	Varchar	20	Country Code
Ti_GivenName	Varchar	50	Delegate's or Athlete's given name
Ti_FamilyName	Varchar	50	Delegate's or Athlete's given name
ti_Transport	Varchar	10	Means transportation to Malaysia
ti_PointEntry	Varchar	20	Point of entry to Malaysia (city)
ti_NewEvent	Varchar	50	Name of Game
ti_ArvDate	Date/time	8	Arrival date
ti_DptDate	Date/time	8	Departure date
ti_ArvTime	Varchar	10	Arrival Time

ti_DptTime	Varchar	10	Departure Time
ti_ArvTrans	Varchar	10	Arrival with what transportation
ti_DptTrans	Varchar	10	Departure with what transportation
ti_ArvFlight	Varchar	10	Flight number (Arrival)
ti_DptFlight	Varchar	10	Flight number (Departure)
ti_ArvLocation	Varchar	50	Arrival location
ti_DptLocation	Varchar	50	Departure location

Table 4.4 Database Structure of Arrival And Departure (Individual) Table

4.4.2.5 Arrival And Departure (Team) Table

This table is used to store the information delegates who reach by team, number of wheelchair users needed, number of blind , arrival and departure date, and time.

Field Name	Field Type	Field Size	Field Description
tt_Country	Varchar	30	Country Name
tt_CountryCode	Varchar	20	Country Code
tt_GivenName	Varchar	50	Delegate's given name
tt_FamilyName	Varchar	50	Delegate's Family name
tt_TotalDelegate	Int	4	Total of delegation
tt_NoBlind	int	4	Number of blind
tt_NoWheelchair	Int	4	Number of wheelchair user
tt_Transport	Varchar	10	Means transportation to Malaysia
tt_PointEntry	Varchar	20	Point of entry to Malaysia (city)
tt_NewEvent	Varchar	50	Name of Game
tt_ArvDate	Date/time	8	Arrival date
tt_DptDate	Date/time	8	Departure date
tt_ArvTime	Varchar	10	Arrival Time
tt_DptTime	Varchar	10	Departure Time
tt_ArvTrans	Varchar	10	Arrival with what transportation

tt_DptTrans	Varchar	10	Departure with what transportation
tt_ArvFlight	Varchar	10	Flight number (Arrival)
tt_DptFlight	Varchar	10	Flight number (Departure)
tt_ArvLocation	Varchar	50	Arrival location
tt_DptLocation	Varchar	50	Departure location

Table 4.5 Database Structure of Arrival And Departure (Team) Table

4.4.2.6 Accommodation Table

This table is used to store the information about the athlete accommodation.

Field Name	Field Type	Field Size	Field Description
a_NewEvent	Varchar	50	Name of game
A_Country	Varchar	30	Country Name
A_CountryCode	Varchar	20	Country Code
A_GivenName	Varchar	50	Delegate's Given Name
A_FamilyName	Varchar	50	Delegate's Family Name
A_Gender	Boolean	8	Male or Female
A_Passort	Varchar	20	Delegate's passport number
A_TotalAthlete	Int	4	Total number of athletes
A_TotalDelegate	Int	4	Total number delegation of delegation staff
A_Location	Varchar	100	Location of accommodation
A_CheckIn	Date/time	8	Date check in
A_CheckOut	Date/time	8	Date check out
A_Food	Boolean	8	Preparation food for the athlete

Table 4.6 Database Structure of Accommodation Table

4.4.2.7 Result Performance Table

This table is used to store the records achieve by the athlete in each sport according to the classification.

Field Name	Field Type	Field Size	Field Description
rp_AthleteID	Int	4	Unique ID for each athlete
rp_NewEvent	Varchar	50	Name of Game
rp_Country	Varchar	30	Country Name
rp_CountryCode	Varchar	20	Country Code
rp_GivenName	Varchar	50	Athlete's GivenName
rp_FamilyName	Varchar	50	Athlete's Family Name
rp_Gender	Boolean	8	Male or Female
rp_Passport	Varchar	20	Athlete's passport number
rp_Category	Varchar	100	Category of disability
rp_SportCompete	Varchar	50	Sport Competed by the athlete
rp_Class	Varchar	20	Athlete classification
rp_Event1	Varchar	20	Event participated by athlete
rp_Event2	Varchar	20	Event participated by athlete
rp_Event3	Varchar	20	Event participated by athlete
rp_Event4	Varchar	20	Event participated by athlete
rp_Event5	Varchar	20	Event participated by athlete
rp_Event6	Varchar	20	Event participated by athlete
rp_Record1	Varchar	20	Result archived by athlete
rp_Record2	Varchar	20	Result archived by athlete
rp_Record3	Varchar	20	Result archived by athlete
rp_Record4	Varchar	20	Result archived by athlete
rp_Record5	Varchar	20	Result archived by athlete
rp_Record6	Varchar	20	Result archived by athlete

Table 4.7 Database Structure of Result Performance Athlete Table

4.5 SUMMARY

This chapter has explained that the user requirements are transformed into a working model. It covers the system architecture which is using three – tier client server application, process design which is depicts the flow of data to, from within the system. Besides, this chapter also covers the system interface design. A user-friendly and attractive user interface depends on the performance of the interface design. For this proposed system, a more easily understandable, straightforward and intuitive user interface will be designed to meet the target user requirement. Lastly, this chapter also explains the importance of database design. The E-R Diagram helps identify the relationship among entities in the database. Database is the core of the whole system and the developer has to consider many criteria to ensure the system integrity.

CHAPTER 5: SYSTEM IMPLEMENTATION

System implementation is a phase which involves coding, debugging and testing. During this phase, the designed modules and functions of the system are transformed into a workable system based on the given requirements. The primary goal of this phase is the production of a simple, clear source code with internal documentation that will ease the processes of verification, debugging, testing, modification and further enhancement. Coding the program requires appropriate tools and languages in order to write the program instructions to fulfill the design specification.

5.1 ENVRONMENT CONFIGURATION AND SETTING

5.1.1) Internet Information Server (IIS)

Windows 2000 Professional is used as the development environment to build the designed system into a functional system. Meanwhile, the requirement for the web server is Internet Information Server (IIS) 5.0. This IIS is built in with the Window NT technologies and come with the Window 2000 professional. After Window 2000 professional is installed, Internet Information Server component will be added from the window 2000 wizard. Web services will start up automatically as soon as installation is complete, and not need to run any further startup program.

5.1.2) Creation of Virtual Directory

Create virtual directory is just a nickname or alias for a physical directory that exists on the web server machine. By creating virtual directory names for all the directories, it is

easy for the user to type in the URL and go directly to the page they want. In this PAMS system one virtual directories is created, it is

- "Paralympic" for the both client and administrator web server. The default page is "*eventList.asp*"

Virtual directory also serves as a good security measure, because it hides the physical directory structure from all the web site visitors. Moreover, it allows the Webmaster web site structure to remain independent if the directory structure in his hard drive.

5.1.3) Microsoft SQL Server 7.0

SQL Server 7.0 is used to store all the necessary data for the entire system. It was chosen as the database management system due to its simplicity and it supports concurrent users to access the same data at a time. In PAMS, one database has been created. The name of the database is *"Paralympic"*. There are totally 7 tables created.

5.1.4) Microsoft Visual InterDev 6.0 and Microsoft FrontPage 2000

Microsoft FrontPage 2000 was used in the earlier stage to create simple web pages for HTML coding. Later, the Microsoft Visual InterDev 6.0 was used when the ASP coding is needed to perform specific function, which cannot be done using Microsoft FrontPage 2000.

5.2) SYSTEM CODING

Microsoft Visual InterDev 6.0 is used in creating all modules. In the process of coding, every algorithm that is designed during designing is transformed into lines of codes.

5.2.1) Coding Methodology

PAMS was developed using bottom up approach, which starts coding at the lower level modules before the higher-level modules. This approach ensures that every module is divided into different modules and sub-modules. PAMS system is divided into three major modules where each one will have its own sub modules. Each sub module is developed one by one and tested for correctness before proceeding to the higher-level modules. Later, the main and sub modules were integrated to ensure functionality .

5.2.1.1) Coding Approach

i. **Coding to connect to PAMS database**

Firstly, a Data Link files must be created. This is method for connecting to data store which avoided the need to type all of the code into a connection string by hand. In ASP, to connect to database, the connection string from Data Link file will copy and include in the ASP code, as show below is need code to connect to SQL Server database.

```
Dim objConn
Set objConn = Server.CreateObject ("ADODB.Connection")
objConn.open "Provider=SQLOLEDB.1;Persist Security
              Info=False;" & "User ID=sa; Initial
              Catalog=PAMS; Data Source=CHUAHPT "
```

In the code, a Connection object is created in ASP. This uses the Create Object method of the Server object to create an instance of the Connection object. It is then given a name, objConn. Then the connection.open .

ii. **Coding to Open a Table in a Database and Query**

After connecting to the database , the data store from the database tables needs to be kept some place where we can refer to it. This time, the *Recordset* object is used to store the data captured from the data store.The open method is used to create a *recordset*. The syntax for the open , method is:

Recordset.Open Source, ActiveConnection, CursorType, LockType, Options

The source here can be a table name or a query. *ActiveConnecitn* refers to the data store connection (As above, *ActiveConnection* here is *objConn*). *CursorType* refers to the type of cursor, for example, static or dynamic. *LockType* refers to the locking of the recordset, whether is it updateable or not. Below here is an example showing the recordset when opening a table.

```
Dim rsLogin
Set rsLogin = Server.CreateObject ("ADODB.Recordset")
rsLogin.Open "Registration", objConn,
        adOpenForwardOnly, adLockOptimistic, adCmdTable
```

Below here is an example showing the recordset to store the result of the query

```
Set rsUserID = Server.CreateObject ("ADODB.Recordset") strSQL =
"SELECT r_UserID FROM Registration WHERE
    r_GameName='" & Request.Form ("GameName") & "'" rsUserID.Open
strSQL, objConn, adOpenForwardOnly,LockOptimistic, adCmdText
```

iii Coding to Get Results From the Form

After the user has submitted the form, the data must be processed and inserted to the database. The method to extract the data from the form is as below

```
rsUesrs("r_UserID") = Request.Form ("UserID")
rsUsers("r_GameName") = Request.Form("GameName")
```

Request.Form is used to extract the data from the form field, *GameName* and *UserID*. This is inserted into the field (in the databas) *r_GameName* and *r_UserID*.

iv **Coding on Using Session object**

Session object are used to store information that can be accessed by the client. Session can be used to track users – to make sure users are allowed to certain web pages only. In PAMS, session is used to make sure the assistant administrators are login before they are attempt to add new information, update or delete the existing information from the database. Set the session object timeout in 60 minutes. To abandon the session, use the *Session.Abandon* method. This is used when administrator logs out from the system. Below here is how PAMS use session to make sure the administrators login and determine which fields and which games they are accessing by tracking down the *UserID* , *GameName, Field* in session.

```
<%If Session ("r_PersonID")<>"0" and Session("r_GameName")=
  Request("event") Then
If Not blnNew Then %>                          'Add new information
    <Input type=reset><Input type=Submit value=Submit>
<%Else %>                                     'delete or update information
 <Input type=submit value=Delete><Input type=submit value= Update>
<%End If
End If %>
```

v **Coding on Using Query String and Getting Its Value**

Query string is used to pass a variable and its value (information) to another ASP page when a query string statement is executed. For example, the code below calls

```
<Form action ="SeacrhResultPerformance?event=<%=Request
("event")%>  Method = "Post" >
```

5.2.1.2) Coding Style

Good coding practice is needed to avoid or detect error easily.

i **Include Files**

Using includes files are like using procedures. It is used when certain codes is repeated again. It allows procedures to be available to many ASP files. Using include files also ease the messy work of correcting all ASP page when a change is done. In PAMS, include files are used on ASP pages which needs database connection. below is an example how to declare include files in ASP pages.

```
<!-- #Include file ="Connection.asp" -->
```

ii **Intent Code**

Although it is not necessary to indent the code to ensure that the code works correctly, but it will be easier to read detect error if the codes are indented. It will be most useful in code which uses many control structure, for example, for loop, if else, do-while and select case.

iii **Comment code**

Commenting the code will make it easier for other people to understand the coding. Sometimes, it also helps ourselves to understand what we wrote a few weeks ago. In ASP, the single quotation mark is used to add comment. Below is an example of it.

5.2.2 Client Side Coding

5.2.2.1 Search Engine

Filename	Description
ListResult.asp	• Allow users to input keywords with Boolean operator AND, '+', OR '-', or NOT, '<>'option to match the searching word by search 'All Words', 'any words' or 'Exact Phrase. • Passes all the values entered to the searchresult page.
ListADIndividual.asp	• Allow users to search information on arrival and departure (team or individual) according to name, country, date arrival and date departure. The method searching is same as descriptive in the *ListResult.asp*
ListAccommodation.asp	• Allow users to search information on accommodation according name, country, date check in and date check out. The method is same as the descriptive in *ListResult.asp*
SportList.asp	• Allows users to search information regarding the sport competing by the athlete. The method searching is same as the descriptive in *ListResult.asp*
DisplayAthleteBiography.asp	• Allows users to search information on the athlete biography according name, country or athlete id. The method searching is same the descriptive in *ListResult.asp*
SearchResultPerformance.asp	• Displays result performance searched. • Allows users to search from this page too
SearchResultArrivalDeparture.asp	• Display result searched • Allows users to search from this page too
SearchResultAthlete.asp	• Display result searched. • Allows users to search from this page too
SearchResultAccommotion.asp	• Display result accommodation searched. • Allows users to search from this page too

Table 5.1 Client Side Search Engine Coding

Below is the coding in SearchResultPerformance.asp to search result performance using the Boolean operator AND with the 'All Words' on the category 'name'

```
If searchfield="Name" Then
   strSQL = strSQL & "("
   strSQL = strSQL & " ( tt_GivenName LIKE '%" & searchword(0) & "%'"
   For s = LBound(searchword) + 1 to UBound(searchword)
      If searchword(s) <> "" and UCase(searchword(s)) <>"OR" and
       searchword(s) <> "-" and UCase(searchword(s))
       If UCase(searchword(s-1)) = "NOT" or searchword(s-1) = "<>" Then
          strSQL = strSQL & " AND NOT tt_GivenName LIKE '%" &
          searchword(s) & "%'"
       Else
         If UCase(searchword(s-1)) = "AND" or  searchword(s-1) = "+"
           Then
         strSQL = strSQL&"OR tt_GivenName LIKE'%"& searchword(s)& "%'"
        Else
           strSQL = strSQL & " AND tt_GivenName LIKE '%" &
        searchword(s) & "%'"
         End If
       End If
   End IF
   Next
   strSQL = strSQL & "))"
End IF
```

5.2.2.2 Result Performance Athlete

Filename	Description
ListResult.asp	• Display the result performance athlete in each competing sport, users able to view in full sport list or either chooses a particular sport they want.

Table 5.2: Client Side Display Information Coding

Below is the code in the *ListResult.asp* to display the result performance athlete in each sport event

```
If Not rsSearchTeam.EOF Then
  Do While counterTeam < 11 And Not rsSearchTeam.EOF
   Response.Write "<Tr Align =left>"
   Response.Write "<Td><Font size=2> <A Href
      =""ArrivalDepartureTeam.asp?Action=Update&event=" & Request
      ("event")& "&ID=" & rsSearchTeam ("tt_ID") & "&viewList=" &
      Request.QueryString ("viewList") & """>" &
      rsSearchTeam ("tt_GivenName")& "</A></Font></Td>"
```

```
    Response.Write "<Td><Font size=2>" & rsSearchTeam("tt_Country")&
        " </Font></Td>"
    Response.Write "<Td align=center><Font size=2> " &
        rsSearchTeam("tt_TotalDelegate")& "</Font></Td>"
    Response.Write "<Td align=center><Font size=2> " &
        rsSearchTeam("tt_NoWheelchair")& "</Font></Td>"
    Response.Write "<Td align=left><Font size=2> " & rsSearchTeam
        ("tt_ArvDate")& "</Font></Td>"
    Response.Write "<Td align=left><Font size=2> " & rsSearchTeam
        ("tt_DptDate")& "</Font></Td>"
    Response.Write "</Tr>"
    rsSearchTeam.MoveNext
    counterTeam = counterTeam + 1
Loop
```

5.2.2.3 Athlete Biography

Filename	Description
AthleteBiography.asp	• Display the Athlete information, users able to click on the Athlete ID to view the athlete biography in detail.

Table 5.3: Client Side Display Athlete Biography Coding

5.2.2.4 Accommodation

Filename	Description
Accommodaiton.asp	• Display the athlete or delegate accommodation information, users allow to click on the Name of athlete or delegate to view the information in detail.

Table 5.4 Client Side Display Accommodation Coding

5.2.2.5 Transportation

Filename	Description
ListADIndividual.asp	• Display the date, time for the delegate arrival and departure. Users able to click on the Name of delegate to view the information in detail. Besides, users also able to view list according only to Team , individual or both of it.

Table 5.5: Client Side Display Arrival & Departure Coding

5.2.2.6 Generate Report

File Name	Description
ListSportReport.asp	• View list in the bar chart

Table 5.6 Client Side View List In Chart Coding

5.2.3 Administrator Side Coding

5.2.3.1 Login

Filename	Description
login.asp	• Allows super or assistant administrator to key in user id and password according to the registered field for the game.
checklogin.asp	• Checks user's authorization according to the registered field for the game.

Table 5.7: Administrator login Coding

Below is the coding in *checkLogin.asp* to check the administrator authorization in each field and for the each game.

```
If rsLogin.EOF Then
    Response.Redirect "Login.asp?Try=True&Field=" & strFieldName &
    "&ID=" & strID & "&event=" & Request ("event")
EllseIf UCase(rsLogin("r_Password"))= UCase(strPassword) Then
    checkField = InStr(rsLogin("r_Field"), strFieldName)
    If checkField <> "0" and Instr (rsLogin ("r_Admin"),strAdmin)
    <>"0" Then
    Dim strName, strValue, strField_Name
      Session.Timeout = 60
      For Each strField in rsLogin.Fields
      strName = strField.Name
      strValue = strField.Value
      Session (strName) = strValue
    Next
     If strFieldName = "Create New Game" Then
      ..............
    Else
      Response.Redirect "Login.asp?Try=True&WrongField=True&event=" &
      Request ("event") & "&ID=" & strID & "&Field=" &
      strFieldName
    End If
Else
     Session ("ID") = Request.Form ("UserID")
     Response.Redirect "Login.asp?Try=True&WrongPW=True&Field=" &
```

```
    strFieldName & "&ID=" & strID & "&event=" & Request("event")
End If
```

5.2.3.2 Change Password

Filename	Description
ChangePassword.asp	• Change assistance administrator password
checkPassword.asp	• Check with old password and assign a new password

Table 5.8 Change Assistant Administrator Password Coding

5.2.3.3 Registration

Filename	Description
adduser.asp	• Register the new assistant administrator by the super assistant administrator. Make sure that registration UserID does same as existing UserId for the same game. It will inform if the entry UserID is already exist. • Change the administrator detail and update • Delete the administrator from list

Table 5.9 Register New Administrator Coding

5.2.3.4 Add, Delete And Update Information

Filename	Description
AddResultPerformance.asp	• Add new result performance into list • Change and update the result information • Delete the result from list
AddAccommodation.asp	• Add accommodation information into list • Change and update the information • Delete the information from list
AddADIndividual.asp	• Add arrival and departure (individual) information into list • Change and update the information • Delete the information from list
AddADTeam.asp	• Add arrival and departure (Team) information into list • Change and update the information • Delete the information from list
addAthlete.asp	• Add new athlete information • Change and update the athlete information

	• Delete the information from list
AddAthletics.asp	• Add information on sport competed by athlete • Change and update the information

Table 5.10 Add, Delete And Update Information Coding

5.2.3.5 Entry Form

Filename	Description
AthleteBiography.asp	• Athlete biography entry form • Display detail in this form
Accommodation.asp	• Accommodation entry form • Display detail in this form
ArrivalDepartureIndividual.asp	• Arrival Departure (Individual) entry form • Display detail in this form
ArrivalDepartureTeam.asp	• Arrival Departure (Team) entry form • Display detail in this form
EntryFormSport.asp	• Sport competing entry form • Display detail in this form
ResultPerformanceAthlete.aps	• Result performance entry form • Display detail in this form

Table 5.11 Entry form of PAMS

5.3) SUMMARY

System implementation is a coding phase which converts the system design into lines of instructions. The web based programming language includes Active Server Pages (ASP), VBScript and JavaScript was used to implement this system. This phase is important to ensure that the system is functional with high reliability.

CHAPTER 6 SYSTEM TESTING

Testing is not the first place where faultfinding occurs. Requirements and design reviews help developers to finds out problems early in the process of development. But testing is focused on finding faults to ensure that every function in programs works correctly accuracy, completeness and reliability. In developing this system, several stages are used for testing. First, each program component is tested on its own, isolated from the other components in the system. It is called as unit testing. It is followed by integration testing. During integration testing, modules are integrated with the interface built, and tested together. It is the process of verifying that the system components work together as described in the system. Next, interface testing is carried out and the whole system is tested

The objectives of testing are stated below:

i. Testing is a process of executing a program with the intent of finding an error.
ii. A good test case is one that has high probability if finding an as yet undiscovered error.
iii. A successful test is one that uncovers an as yet undiscovered error.

6.1 TYPES OF TESTING

The testing process is implemented throughout the development of PAMS. It is implemented in stages because the system itself is composed of modules. Testing conducted include unit testing, integration testing, user interface and system testing.

Bottom-up testing strategy was used where testing starts with the fundamental components, and later works up the hierarchy of modules until the final modules is tested.

Validation testing is done throughout the various tests. Validation is accomplished simple by executing a real-life function. For example, under the unit testing, the testing of a single program, or unit of code by the developer of the unit, validates whether the system is perform as designed (Perry,2000).

6.1.1 Unit Testing

Unit testing focuses verification effort on the smallest unit of software design which is the software component or module (Pressman, 2001) Unit testing tests individual components to ensure that they operate correctly. These components include function and subroutines. Each component is tested independently, without other system components.

The unit testing involves:

- Testing the interfaces to ensure that the information flows properly into and out of the program unit.
- Testing the boundary conditions to ensure that the components are operating correctly at boundary values.
- Make sure that all independent paths in a control structure are tested at least once.
- Testing all error handling paths

Throughout the development of PAMS, unit testing was done after the development of each component and not at the end of development of the whole system. Testing was done with all sorts of ways to check for errors. If it was tested to be functioning correctly, development of the next function will be carried out. Else, debugging is carried out to identify the errors before having it tested again. This is to ensure the

components are operating correctly and without errors. Many tests were involved during the unit testing. Below here are some examples of it.

i. **Unit Test Case 1**

In the administration module, administrators are allowed to change their password. The test was done to change the administrator's password and login again with the new password.

No	Test Procedure	Output	Analysis of Test Result
1	Click on "Change Password" link from the admin login page.	Change password form display to enable administrator to change their password.	The user id list box will display all the registered administrator. Only these administrators are able to change their password.
2	Select the user id from list box and enter the old password. Then key in the new password and new password is required to key in again in the confirm password text box. Click the submit button.	Message prompt if the new password do not match the confirm password. Besides, if the old password do not match the selected user id, message error will prompt out	The old password had changed and assigns a new password to the administrator and inserted to the database.
3	Login again with new password.	Message "welcome for those who are successful login will prompts out at the top of the left menu.	Function of changing password successful. The old password was replaced with a new password in the database.

Table 6.1 Test Case for Changing Password

ii. Unit Test Case 2

Both the client and administrator are allowed to search using search engines from their own modules. They can key in the keyword word or phrase in the search text box and select the search field (name, country, date, athlete id). Besides, this search engine able to search by 'All Words', 'Any Words', or Exact Phrase'. They also can type the key word with the Boolean operator AND, OR or Not or the symbol '+', '-' or '<>'. Testing was done to ensure that the correct record hits are displayed according to the keyword entered by user.

No	Test Procedure	Output	Analysis of Test Result
1	Enter keywords 'Japan AND Malaysia' in the text field and search by 'All Words'. Click go button	Go to search result page and 10 records are displayed	10 hits displayed as expected.
2	Enter the same keyword with search by 'Any Words'. Click go button	Go to search result page and no record found will display	No hits displays as expected
3	Enter the same keyword with search by 'Exact Phrase'. Click go button.	Go to search result page and no record found will display	No hits display as expected
4	Reenter keywords 'Malaysia AND Japan' in text field and choose search by 'All Words'. Click go button	The number of records displayed are same as test procedures 1.	10 hits display as expected.
5	Enter keywords 'Malaysia OR Japan' in the text field and choose the 'All Words'	No record found in the search page.	No hits displayed as expected.
4	Enter keywords 'Malaysia Japan' in the text field and search by 'Exact Phrase'	No record display in the search page.	No hits display as expected.

Table 6.2 Test Case for Searching Keyword

iii. Unit Test Case 3

There are two types of administrator in this PAMS, they are super administrator and assistant administrator. The super administrator is responsible to register the new and change assistant administrator detail and allow them access to certain page according to the registered page. As a result, testing is done to check the administrator authorization.

No	Test Procedure	Output	Analysis of Test Result
1	Super administrator login to the registration page	Go to the registration page and 'welcome superadmin' message shown at the top left menu bar.	Super administrator successful login to the registration page.
2	Add the new assistant administrator detail and check the 'Athlete Biography' checkbox. Then, click add button.	Assistant administrator detail will display in registration page.	New assistant administrator had added to the list.
3	Assistant administrator login to the 'Athlete Biography' page.	Go to 'Athlete biography' page and 'welcome' with the assistant name message will shown at the top left menu bar	Registered assistant administrator successful login to the 'Athlete Biography' page.
4	Assistant administrator login to other page (other than 'Athlete Biography') page.	Message prompt out to inform the login 'field' is incorrect.	Assistant administrator only authorize login to the registered field.
5	Super administrator update the assistant administrator detail by allows them access to all fields.	Update detail will show in the table.	Assistant administrator able to access to all fields.
6	Assistant administrator login to other page (other than 'Athlete biography page')	Go to the page according to login field.	Assistant administrator successful login to the other page.

Table 6.3 Test Case for Administrator Access Authorization

6.1.2 Integration Testing

The objective of integration testing is to know whether the entire system is able to function as expected. All modules that are developed separately will be combined to form a complete system. Approach that applied in integration testing is top-Down Integration, where the highest-level main module is tested first and sub modules are then added gradually

i. Integration Test Case 1

The client's module integration is done and tested to ensure that all units for users work correctly.

No	Test Procedure	Output	Analysis of Test Result
1	Click on '1st Para Game' from the Home page to access to the next page (*selectedevent.asp*) Then click on Result performance. (*ListResult.aps*). The detail of result can be archived by click on 'AhtleteID' (AthleteBiography.asp)	A list of result performance athlete for the '1st para game' is displayed in the table. The detail is shown on athlete biography entry form .	Any user can access to the user module without login but they are forbidden to change the information.
2	Search using keywords and Boolean operators AND, OR or NOT and then search by 'All words', 'Any words' and 'exact Phrase.	Number of records is displayed according to the correspondent link. The numbers and 'Next>>' hyperlink are displayed if the records found are more than the number of result per page.	The numbers of record for correspond game are displayed and record correctness is checking according the record in the database. Clicking the 'Next>>' hyperlink will display the next number of result.
3	View the total participant for each sport in chart (*listSportReport.asp)*	Total of participant in each sport represented in graph accordingly.	The total participant of each sport should be same as shown in list

Table 6.4 Integration Test Case 1

ii. **Integration Test Case 2**

No	Test Procedure	Output	Analysis of Test Result
1	Login as super administrator with valid ID and password.	Go to correspond page and the 'Welcome Superadmin' will indicate at the top of the left menu.	Successfully checks for valid ID and password.
2	Click the 'UserID' from the (*registration. asp*) link to (*addUser.asp*) and change the detail. Click 'update' button.	A form displays the corresponding user id details. The administrator's new details will display in the table after 'update' button is clicked.	Check on the new details for correctness and found out the details were changed.
3	Add the new 'Athlete biography' (*addAthlete. asp*), result performance (*addResultPerformance. asp*) , accommodation *(addaccommodation.asp)* through the administrator site.	These new information should be able seen by the clients at the client site at the correspondent page.	The new information is added into the each field respectively.
4	Update athlete biography information, result performance from the list through the administrator site.	The updated information should shown the different from the pervious record.	The information is successful change form the list.
5	Delete athlete biography information, result performance from the list through the administratir site.	Deleted information should be move from the list at the correspondent page.	The information is deleted from the field.
6	Logout from the administration site.	Go to home page and the phrase ' welcome to the successful login person' is disappearing.	The administrator had logout from the administration site

Table 6.5 Integration Test Case 2

6.1.3 Interface Testing

The interface should be user friendly and not misleading. Linking from one web page to another must be given in a suitable way and error messages must be clear and straight to point. It is crucial to ensure that the user understands what he/she is doing, and knows what is the expected outcome.

i Interface Test Case 1

No	Test Procedure	Output	Analysis of Test Result
1	Use the different size of computer to test the system	The differentiate between the alignment of the layout for each different size computer	The alignment of the layout must be acceptable
2	Show the system to the real user and give the comment on the interface design.	The interface should acceptable by the real user.	Make the changes regarding the response from the real user.

Table 6.6 Interface Test Case

6.1.4 System Testing

System testing is a series of different tests whose primary purpose is to fully exercise the computer-based system. Although each test has a different purpose, all work to verify that the system elements have been properly integrated and perform the allocated functions [31].

System testing is done to ensure that the system fulfills the customer's requirement. The integrated modules must be operated with other system elements such as hardware, databases and end-user.

The objectives of system testing are to ensure the developed system functions properly without faults or errors, process incoming data correctly and output accurately, expected data, guarantee that the user interface is intuitive so that the end user can interact easily with the system.

In order to ensure that the whole system (after integrate with other two system –PSMS and POSC) functions properly work before delivering to the client (MPC), we have tested the system with the staff in MPC. A few staffs from the MPC were selected to test this system. Test script (enclose in **Appendix**) was distributed to them. They tested the system regarding the test script that we had given to them. Besides, we also explained the system flow to them to let them easier to give the comment regarding the system we had developed.

From the test script, 80% said that the system is user-friendly. The system functions are straightforward without sophisticating feature. The end users know how to operate with the system functionality such as search engine and fill in the forms easily for the administrator side. 70% tester said that this system is quite suitable for their admin usage but if want fully use this system, some of the feature need to add in to built up more complex system.

100% of the users understand the error messages that were prompted out whenever they entered invalid input to the system or blank the mandatory field. Before saving data to the database, data validation process will check for acceptable information. For example, if a user tries to input invalid format date, an error message will prompt out asking user to input valid date.

6.2) SUMMARY

Many types of tests are done before a system can be released to the client. The objective of software testing is to detect errors, debug errors and generate functional programs. To achieve this objective, four types of testing namely unit test, integration test, interface test and system tests are carried out.

Unit testing is done to test functional specification of individual components. Integration testing checks the incorporated components with the interface built. It is the process of verifying that the system components work together as described in the system. Interface testing is to make sure that the design of system is acceptable by the user and to test the understanding of operate system by themselves. Lastly, system testing validates software once it has been incorporated to a larger system.

During the testing phase of PAMS, many types of errors occurred which causes system failure. However, process of debugging was done and the causes of errors were identified.

CHAPTER 7 SYSTEM EVALUATION

System evaluation is a process of evaluating the developed system and it is the ultimate phase of developing a system before delivery the system to the end users. Evaluation was related to user environment, attitudes, information priorities and several other concerns that are to be considered carefully before effectiveness can be concluded. At all phases of the system approaches, evaluation is a process that occurs continuously, drawing on a variety of sources and information. It also states all the problems faced and their solutions as well, system limitations, system strengths and future enhancements.

7.1 PROBLEM AND SOLUTION

Various problems were encountered during the development of PAMS. Most of the problems occurred due to lack of experience and knowledge in web-based programming. Some of the problems were resolved by changing the design which is stated earlier. Below are the problems and their solutions.

7.1.1 Difficulties in choosing a Programming Language

Problem: There are several popular programming languages in the market which are used for web development. Choosing a suitable programming language was a critical process as all tools have their own strengths and weakness.

Solution: In order to solve this problem, I search information from Internet and study on the strengths and weaknesses of each programming language before I make the decision. Besides, I also seek advice and a view from coursemates and even seniors in different project which had been carried out. This has given me the bird's eye view for

some programming languages because my coursemates has experienced various programming languages during their industrial training. After that, I have chosen a programming language that support all the requirements defined in PAMS system.

7.1.2 Setting Up Connection

Problem: As the whole PAMS planned to be developed using Microsoft Visual InterDev, configuration with Windows 2000 Professional, Visual InterDev and SQL Server 7.0 must be set up. There was difficulty when trying to connect the Project in Visual InterDev to the Windows 2000 Professional operating system as the local server. Several attempts were carried out to reinstall the software yet the effort failed.

Solution: The Windows 2000 Professional operating system was reinstalled using a different file system which is NTFS. Before this, the file system selected is FAT 32. After using NTFS, the connection was successfully made.

7.1.3 Lack of Knowledge In Web-based Programming

Problem: The programming of web-based application does not only involve the setting of the server and the development of executable codes. Structure designing is also required. Besides, not much time is spent on studying the ASP web-based programming since there are other things to learn such as Visual InterDev 6.0 and Microsoft SQL Server 7.0. Difficulties were encountered during coding in the early stages of developing the PAMS system.

Solution: Much reading, understanding the ASP script and analysis have provided assistance in solving various problems. Discussing with friends and participating in web-side forums are also helpful in order to solve the problems.

7.1.4 Lack of Time

Problem: Since too much time was spent on learning ASP, SQL Server 7.0, Visual InterDev 6.0 and debugging errors in the earlier stage, the time less is insufficient. Several functions under planning are unable to be developed. Audit trail table function suggested in the earlier stage is ignored.

Solution: This function is suggested in the future enhancement part.

7.1.5 Determine Scope of The System

Problem: It's quite hard for me to determine the scope of the system, as this is system management athlete information. The detail that involved in the management process is unclear because of the inexperience in the topic. Beside that, the resources get from the Malaysia Paralympic Council is quite litter. As a result, fully implemented such system was another hindrance to implement true workable system.

Solution: Finally, many discussions were carried with group members and coursemates to help me outline the scope of the project to be build in the initial stages. Besides, always keep contact with the officer in MPC to ensure defined scope is fulfilling the requirement. Surfing on Internet also gained some idea in defining scope.

7.1.6 Use of Microsoft SQL Server

Problem: The concept of using the Database Management System (DBMS), which is Microsoft SQL Server 7.0, is quite confusing during the early stage of the PAMS development. The connection from Visual InterDev 6.0 to SQL Server 7.0 failed. As a result, all data cannot be selected, inserted or deleted from the database during the unit testing.

Solution: Advice and guidance from coursemates have contributed to solving this matter. The cause of problem was identified and the database security login name was changed to 'sa' and the database selected is Paralympic.

7.1.7 System Integration

Problem: After finishing develop the PAMS system, integration with other sub two system (PSMS and POSC) was carried out. During the integration, a lot of the errors were found because of the different synchronization. The data is unsuccessful pass from the other sub system, especially in the *create new game* sub module of the PSMS.

Solution: Synchronization of the whole is done again and a lot of changes on system coding also carried out. After that, system integration is done again.

7.2 SYSTEM STRENGTH

7.2.1 Authorization and Authentication

Every administrator has a user ID and password to access the administrator module of PAMS. The super administrator has priority to access certain sites which are prohibited from access by other administrators. This security feature is aimed in preventing unauthorized administrator from accessing the system critical or sensitive data.

7.2.2 Search Engine

PAMS provides a search engine that can search athlete information, result performance, delegate arrival and departure date and time by entering keywords only. Boolean operator can be used to make the searching more efficient and faster. Search data on the particular field /category can be make by select the field from the dropdown list box.

Besides, user can search the query by 'All Word, Any Words, or Exact Words' to match the result.

7.2.3 Error Controlling

PAMS provides easily understood error messages when a user attempts to perform illegal action, a process is unsuccessfully done, error in accessing database and so on. For example, when an administrator tries to summit a form without filling the mandatory field completely, the message box with "Mandatory field is required" will be prompted out.

7.2.4 User-friendly Interface

PAMS system designed with user-friendly Graphic User Interface (GUI) components, such as interactive bar menu, hyperlink to other pages, dynamic side navigation etc. This is used to minimize the user actions when performing certain task.

7.2.5 Time-effectively with Less Manpower Management

PAMS helps administrator to manage athlete information time-effectively with less manpower and provide computer system and paperless working environment with the purpose to improve the system athlete management in MPC. This will overcome of the overload paperwork and also help to increase work efficiency and productivity.

7.2.6 Database and System Transparency

All the users including the administrator are not exposed to the database management system, system structure and system coding. So, the users do not need to know anything related to the built system.

7.3 LIMITATION

7.3.1 Browser Limitation

PAMS is limited to certain browser. Most of the scripts are written in VBScript which is not supported by other browsers such as Netscape Communication. Thus, PAMS can only run with browser Internet Explorer or above.

7.3.2 Password

The PAMS system does not provide a function for the administrators to retrieve their passwords once they have forgotten their passwords. So they have to refer to the super administrator once they forget their password.

7.3.3 System Use Only for Certain Game

Develop of this system is only suitable use for running the Para Game. Other than that (Fesipic Game, National Game) are not suitable because lack of a few features which are required for running the other game.

7.4 FUTURE ENHANCEMENT

7.4.1 Printing Report

This system does not provide the print function. The generated report only can print by using the window print function. To print the report generate by the system in appropriate format, print function should provide. Print out the report is important and easier for the analysis purpose. The reports contain a critical as well as important data that required by the higher level management. It also can function as to evaluate the performance of the athlete for every game. So, printed reports are always helpful especially for analytical purpose.

7.4.2 Less Useful Report

Even though the report is generated from the system, but it can still be improved by providing more useful and meaningful reports for the management. Reports such as show in bar chart should provide more detail about how many participants for each classification sport and also state how many male, female for that classification sport.

7.4.3 Create New Table For The New Game

In this PAMS system, all the information is stored into the same table for every different game. For example, athlete biography information for 1st Asian Para Game and 2nd Asian Para Game are store in the same table. Store information in a different tables for the different game will easier the administrator to manage the information. So, the system should able create a new table by itself with the same table structure when a new game is created.

7.4.4 Suitable For All Game Usage

After we tested the system in MPC, we informed that this system is only suitable use for running the Para Game, other than Para Game such as Fespic and national game is not suitable. So that, the other feature should add in to make the system more complicated for the usage for all the game.

7.4.5 Password Encryption

The password field in the administrator table is not encrypted. This exposes it to security risk because the password is not in confidential form and it can be easily seen and might be used for illegal purpose.

7.4.6 Database Integrity

The backup and restore function was not included in this system. This function is very important if an accident occurred causing damage to the system and database. So, the contingency planning is needed because the disaster will cause loses to the information. The backup must be schedule in one proper manner that the important and critical data must backup in daily basis.

7.5 KNOWLEDGE AND EXPERIENCE GAINED

Throughout the development of PAMS, a lot of valuable knowledge and experience were gained. The fundamental of web application development was learnt especially in Web-based programming language such as Active Server Page, VBScript and Java Script. Furthermore, knowledge on SQL Server 7.0 and Visual InterDev 6.0 were gained through the whole system development. Besides, knowledge on setting and configuration of the hardware and software was gained too.

The most valuable experience from the PAMS development is going through the whole system development life cycle. Additionally, software engineering techniques were applied and the theories that have been learnt were put into practical use. Besides, the communication skill also gained when having the interview with officer in MPC and also officer in Sport Science Center of University Malaya.

After accomplishing this project, a clearer picture of a programmer and an analyst job was revealed. Apart from this, their responsibilities include meeting with users to understand users' requirement, coordinate project resources, prepare for project documentation and others.

Overall, this project development benefits in all aspects in preparing those who want to become a programmer.

7.6) SUMMARY

The PAMS has been completed successfully whereby the system has gone through all the system development life cycle. System Evaluation is the last phase in the system development. It is an evaluation and review process for the end system. Through this evaluation, developer can review the problems encountered and solution to solve it. Moreover can understand more about the system strengths and system limitation. Then, a more complete and comprehensive system can be developed in the future enhancement.

CHAPTER 8 CONCLUSION

This project is going to develop a Paralympic Athlete Management System (PAMS) which is used to provide user athlete information and also manage the athlete information when running the game.

From the first phase of development of this system which is done in the first semester is to carried out the research and study on material are related to the project. Define the objective of the project and also determine the system scope. Besides functional requirement of the system must be finalized in this stage. Consideration of the development tools also carried out to chose the pertinent tools in developing this system. In this stage, system design also be done, to transform the functional requirement to the working model. In the second phase which is done in the second semester is to implement the whole system. After built up the system, system testing and evaluation were done by several groups of users.

From the process gather the information until built up the whole system, it provide a golden opportunity to learn how to communication with each other either with group members or outsiders. It is a valuable yet enriching experience.

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APPENDIX

A

Revision History

Jan 17, 2002	*Chan Foo Keong* *Chuah Poh Thye*	*First Version*

Title:

Paralympic Athlete and Sport Management System

- *Paralympic Sport Management System*
- *Paralympic Athlete Management System*

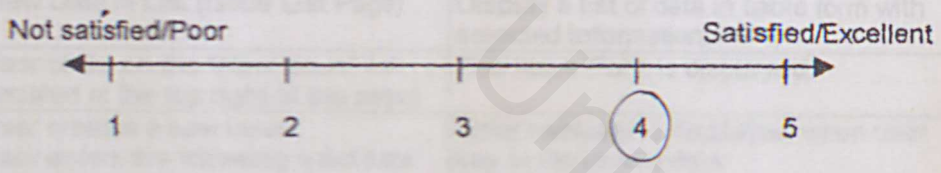
17 Jan 2002 Reviewed by :

Lt Cdr (R) Kamaruzaman Kadir
Manager
Paralimpiad Malaysia & Event.

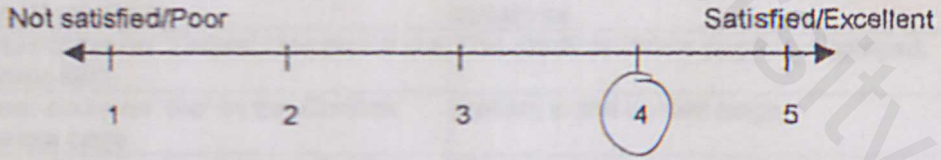
Test Conditions and Expected Results

Are you satisfied with the application?

Paralympic Sport Management System



Paralympic Athlete Management System



No #	Test Condition	Expected Result / Objective	Pass/Fail	Command
1	Interface – Main Page	User interface	P	Pictures to be improved
2	Interface – Other pages	User interface	P	
3	Main Page	List Down all the Paralympic event.	P	
4	Access the Issues and Risks Module.	The Issue List page is displayed. A list of all issue is displayed.	P	
5	User clicks on the menu button.	The links of the Issue List page is displayed. The button is highlighted.	P	

No #	Test Condition	Expected Result / Objective	Pass/Fail	Command
6	User clicks on the link.	The Issue List page is displayed.	P	
7	Administrator Login	Protect the database	P	
8	View Data in List (Issue List Page)	Display a list of data in table form with selected information.	P	
9	User clicks on the "New issue" link (located at the top right of the page)	The Issue Form is displayed.	P	
10	User creates a new issue. User enters the following valid data and clicks "Add"	Error message is displayed when user key in the invalid data. Data will be inserted into database.	P	
11	User clicks on an issue link (at the Issue List page) to view a project.	The Issue Form is displayed with the detail information.	P	
12	User clicks on "Update" (located at the Menu Bar).	The new data will be inserted into database.	P	
13	User clicks on "Delete" (located at the Menu Bar).	The Confirm Delete page is displayed.	P	
14	User clicks on "No" in the Confirm Delete page.	Return to the current page.	P	
15	User clicks on "Yes" in the Confirm Delete page.	The selected issue is deleted.	P	
16	Display data by type	Display Data according to type chosen by user.	P	
17	Search Module	Search data and display the searched data.	P	

Problems/Weaknesses of the Application

Please list down the problems or weaknesses of the Application

1. The photos are not very clear / and small
2. Certain information in the forms not complete.
3. Add in a few more pictures.
#.

Future Enhancements

Please List down the future enhancements:

1. Add up Start List
2. Add in MPC logo
3.

APPENDIX

B

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PART IV USING ADMINISTRATION MODULE

LIST OF FIGURES

INTRODUCTION

Paralympic Athlete Management System (PAMS) is a system that provides an athlete's information and manage the athlete information when organizing the games. This system enables users to record, update and retrieves the new information required easily and also provides a quick search on the data.

This system has two major modules, namely

i. **User Module**

This module is catered for users. Administrator has access to this module also. Users can search the athlete information through this system.

ii. **Administration Module**

This module is only for administrator. Users are not allowed to access this module. There have two types of administrator – super administrator and assistant administrator. Super administrator is responsible to register a new assistant administrator and create a new game. Meanwhile the assistant administrator is responsible to keying the collected data. Both administrators also can perform searches on data through the search engine.

This system is easy to use and learn. A simple point and click can execute all functions in the system. This manual will provide guidance on how to use this system.

ABOUT THIS MODULE

This manual is organized into 4 parts, namely

i. Hardware and Software Requirement

This section contains the hardware and software requirement for both server and client's computer.

ii. Setting Up Paralympic Sport And Athlete Management System

The method to set up the system is elaborated here.

iii. Using User Module

User module consists of 5 sections. In this section, all function of User Module are discussed. Samples of screen are also shown.

iv. Using Administration Module

Administrator consists 6 sections where it is then divided into sub sections. In this section, all functions of administrator Module are discussed. Samples of screen are also shown.

Part I: Hardware and Software Requirements

Below here are the software and hardware requirement for both client and server.

1.1 Hardware Requirement for Server

i. At least 64 MB RAM but 128 MB of RAM is more ideal
ii. At least 233 MHz processor
iii. At least 1 GB free hard disk space
iv. And other standard peripherals that include keyboard, mouse and monitor.

1.2 Software Requirement for Server

i. Windows 2000 professional
ii. Microsoft SQL Server 7.0
iii. Internet Explorer 5.0 or above
iv. Internet Information Server 5.0

1.3 Hardware Requirement for Client

i. At least 32 MB RAM
ii. At least 166 MHz processor
iii. Other standard peripherals, including keyboard, mouse and monitor

1.4 Software Requirement for Client

i. Windows 95/98 or Windows 2000 Professional
ii. Internet Explorer or above.

Part II: Setting Up Paralympic Sport And Athlete Management System

2.1 Install IIS and SMTP Server instructions

- Click on *Start* > *Setting* > *Control Panel* > *Add/Remove Programs.*
- *Add/Remove Programs windows will appear*, click on *Add/Remove Windows Component* button.
- Check on *Internet Information Services* and press *Next* button. A message will prompt to ask user to put in the windows 2000 or XP installation CD.
- Follow the instruction provided to complete the IIS and SMTP server installation

2.2 Install and configure MS SQL Server 7.0 instructions

- Insert MS SQL Server 7.0 CD, a setup menu will pop up. Click on *Install SQL Server 7.0 Component*. Then, click on *Database Server - Desktop Edition* to start the set up of MS SQL Server into your PC. Follow the instructions provided to complete the installation.
- After the set up process is complete, click on *Start* > *Programs* > *Ms SQL Server 7.0* > *Enterprises manager.*
- Created a blank database with the name "*paralympic*".
- After the database created, click *Start* > *Programs* > *Ms SQL Server 7.0* > *Query Analyzer.*
- In then *Query Analyzer,* open "*paralympic.sql*" from the "*database*" folder in the CD and select DB to "*paralympic*". Run the Query to created table into the new database created

2.3 Install Paralympic Sport And Athlete Management System instructions

- After configure the Ms SQL, administrator has to copy the folder named "*pams*" in the CD into the folder named "*wwwroot*" under the "*Inetpud*" folder. This

folder. This folder includes all the ASP files, HTML and other files, which are used in the system.

2.4 Starting Paralympic Sport And Athlete Management System

- Before start Paralympic Sport And Athlete Management System, please make sure IIS server and MS SQL Server is running.
- Now, the Paralympic Sport And Athlete Management System is ready to use.
- Open IE browser and enter **http://http_host/psams/eventList.html**, "***http_host***" is web server host name and "***psams***" is Paralympic Sport And Athlete Management System root folder
- Example: **http://localhost/psams/index.html**
- The super administrator username is ***superadmin*** with a temporary password "***123456***". Administrator is required to change password after login.

Part III Using User Module

3.1 Starting PAMS for User Module

1. Open the web browser, which is Internet Explorer
2. Then type the address (URL) and press Enter. The address will be *http://computername/PAMS/eventList.asp* where the *computername* is the web server name that PAMS is located.
3. After that, the main page of PAMS can be seen as shown on below.

Figure 3.1 Main page of PAMS

4. At this page, you can see a list of games with the start date and venue of the games, which is shown in a table. User can access every game by click on that hyperlink. For example, users can search information on *Para Game* by click on the *Para Game* hyperlink.
5. At the bottom of this main page, there have other two hyperlinks- *One Stop Center* and *Super Administrator Login.*
6. *One Stop Center* hyperlink is provides a link to Paralympic One Stop Center (POSC*) system.*
7. *Super Administrator Login* hyperlink is only provides for the super administrator who want to create a new game (eg, 2nd Para Game) or add a new assistant administrator.
8. At the right side of the frame, there are some links, which are provided for users to quick search on the medal achieved by the country.

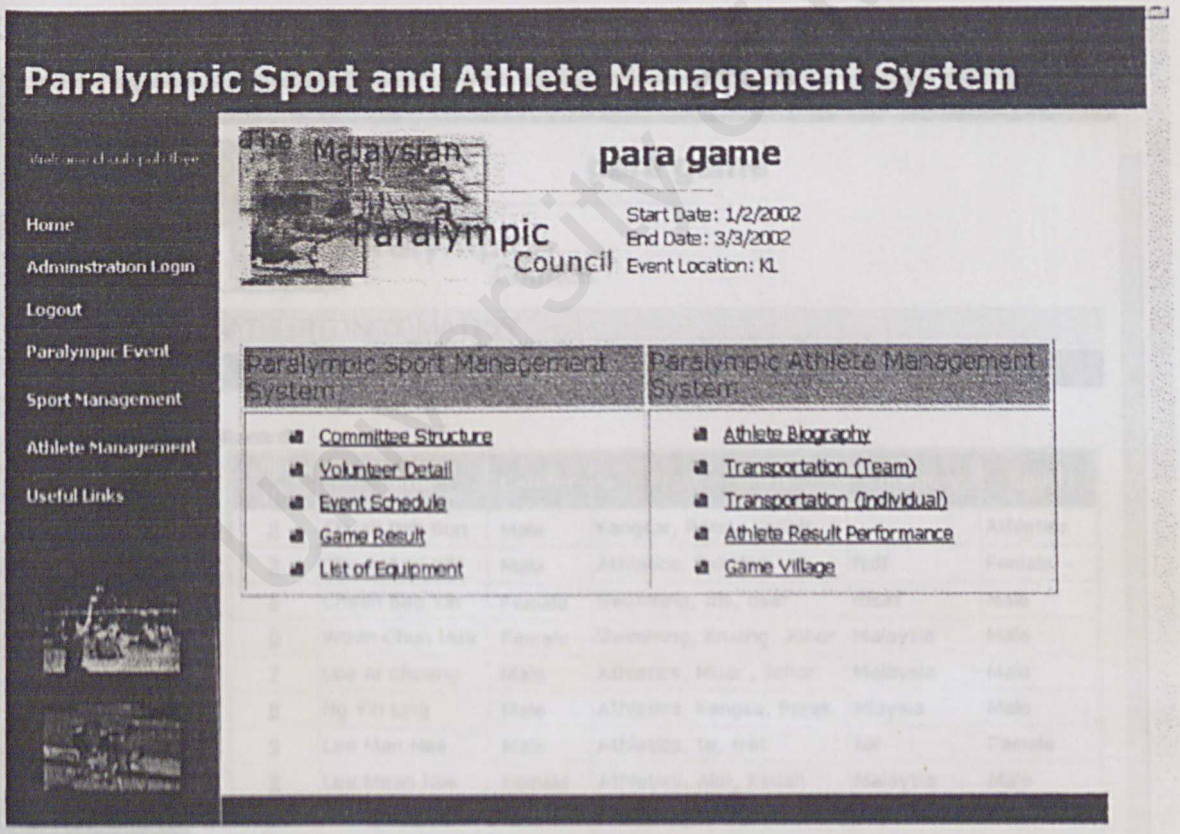

Figure 3.2: Second page of PAMS.

1. After click on *Para Game* link, you will access to this page and the information you will search all are related to *Para Game*.
2. Table shown in this page consist of two columns, which is information about the sport management and information about the athlete management. In this user manual, only the information on the athlete management will discuss.
3. User can access to the athlete management field by click on the link.
4. All the screens in this system have a left menu on the left side after access from the main page.
5. Click on the left menu will drop down another list. For example, click on the *Athlete Management* link will drop down a list of Athlete Biography, Transportation, Result Performance and Game Village. (can see in Figure 3.3)
6. This left menu list is to provide a quick link to the required page.

3.2 Athlete Biography of User Module

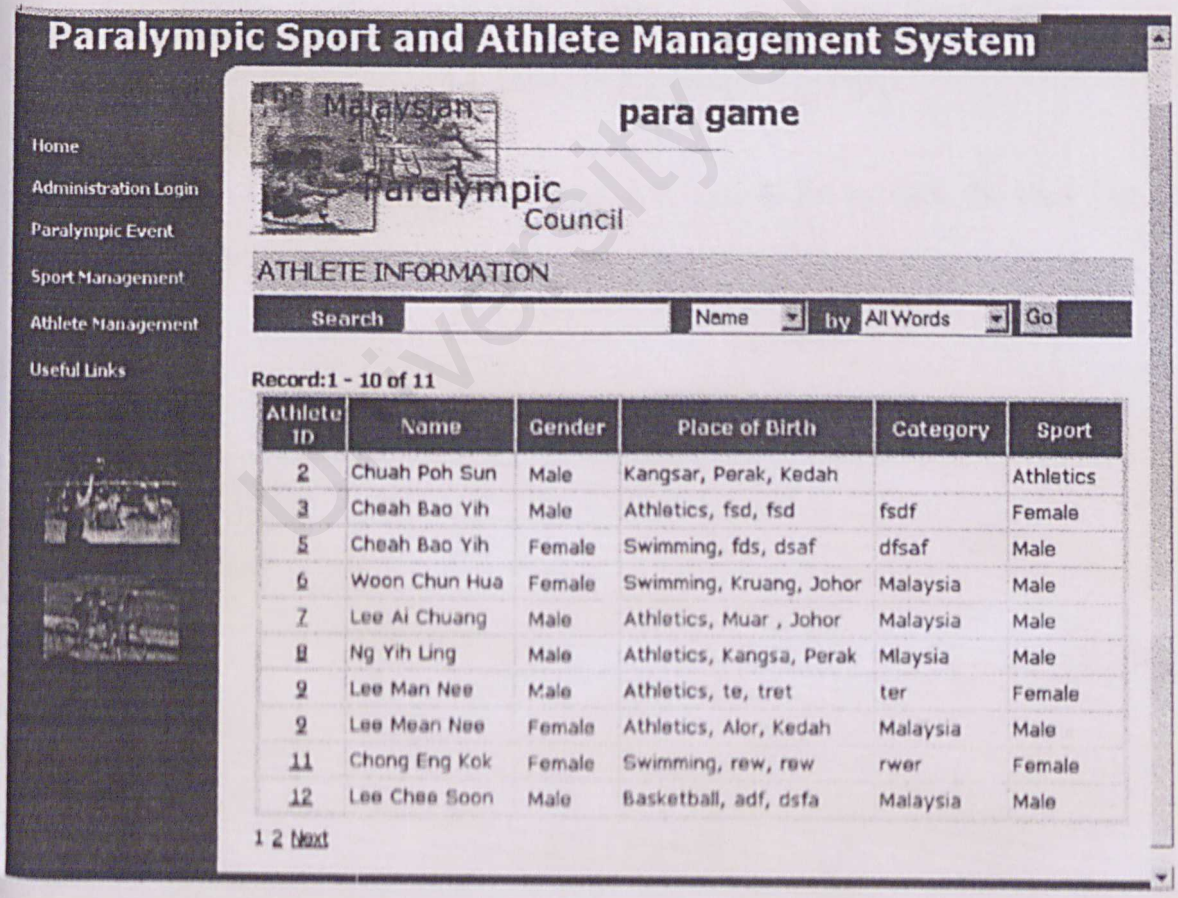

Figure 3.3: List of the Athlete Biography Information

1. The figure 3.3 display entire 'ist of the athlete biography information of the Para Game.
2. The list of the table is only shows some important information about athlete biography. If the users want to get the detail of each athlete. They can achieve by click on the *Athlete ID* link. This link is to show the detail of the athlete you selected which is displayed in form format. You can see in the figure 3.4.
3. Total records of the athlete biography information are shown at the top of the table list, which are 11 records.
4. Every table is only display 10 records. If the total records are more that 10, the records will be shown in the next page. The link is provided at the bottom of each table if the found records are more than 10.
5. This link also provides for the user directly go the desire page by click on the number. If go to the next page, user can click on the *Next* link.

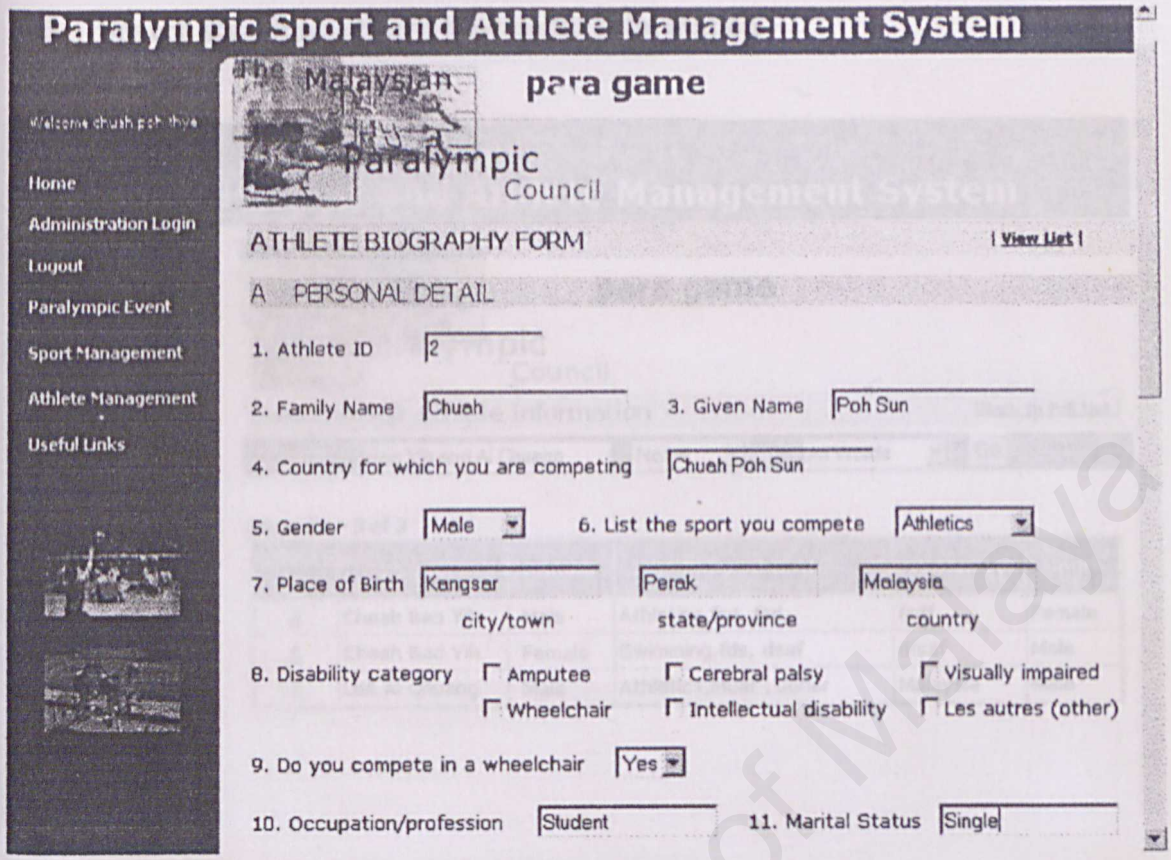

Figure 3.4 Detail of the Athlete Biography

6. After get the detail of the athlete, user can back to list by click the *View List* link which is shown on the top.

3.3 Search Result of Athlete Biography Information

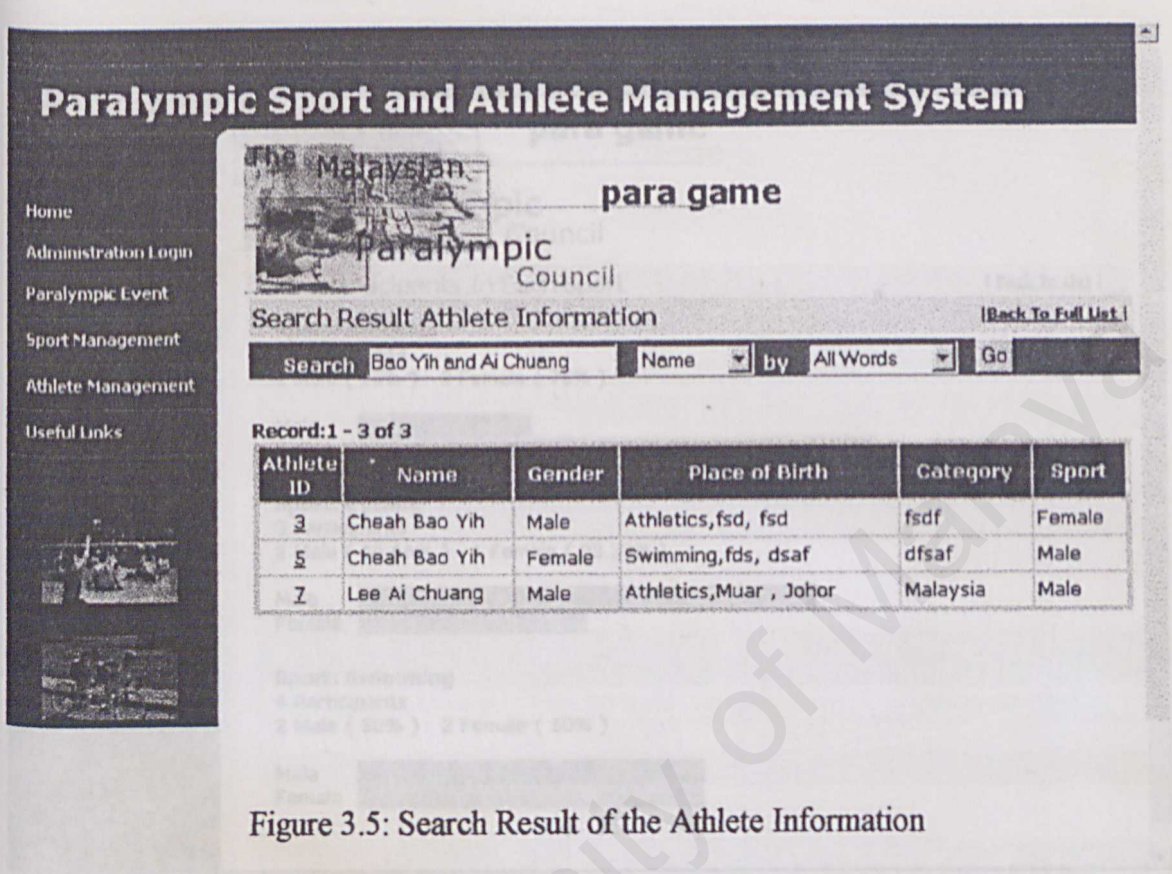

Figure 3.5: Search Result of the Athlete Information

1. Figure 3.5 shows the search result of the athlete information.
2. User can search the information by type the words into the search text field and select the category field and then user also can search by All Words, Any Words or Exact Phrase is provided. Then press Go button.
3. Figure 3.5 shows the search result on the Name category and search by All Words.
4. After searching, user can continue their searching through this page also. Once searching is finished, back to full list by click on the *Back to Full List* which is shown at the top of the search bar.

3.4 View Report In Bar Chart

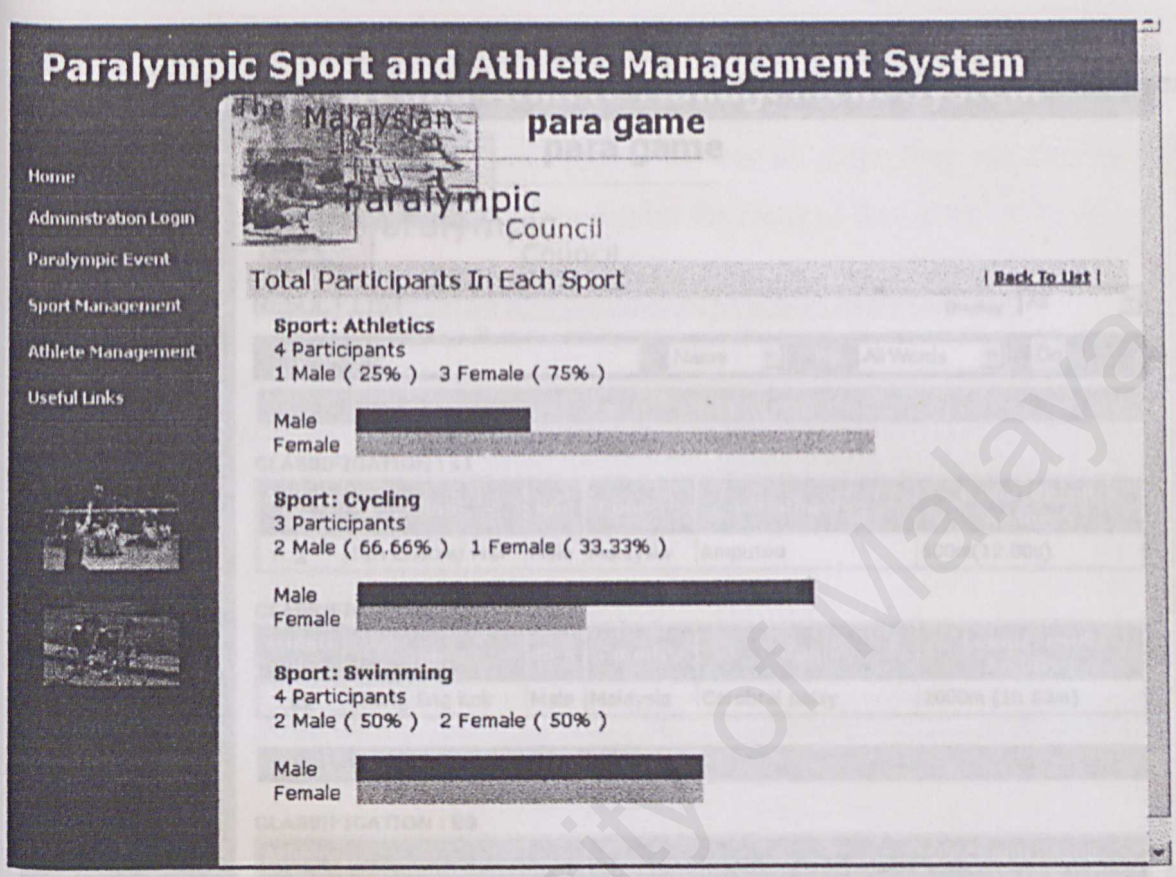

Figure 3.6: Total participant in each sport type

1. Figure 3.6 shows the total participant take part in each sport type in the *Para Game.*
2. Percentage is count according to Male and Female, and then displays the result in the bar chart, which can see as above figure.
3. If the user wants to display the list in table format, they can click the *Back To List* link to the correspondent page.

3.5 Result Performance of User Module

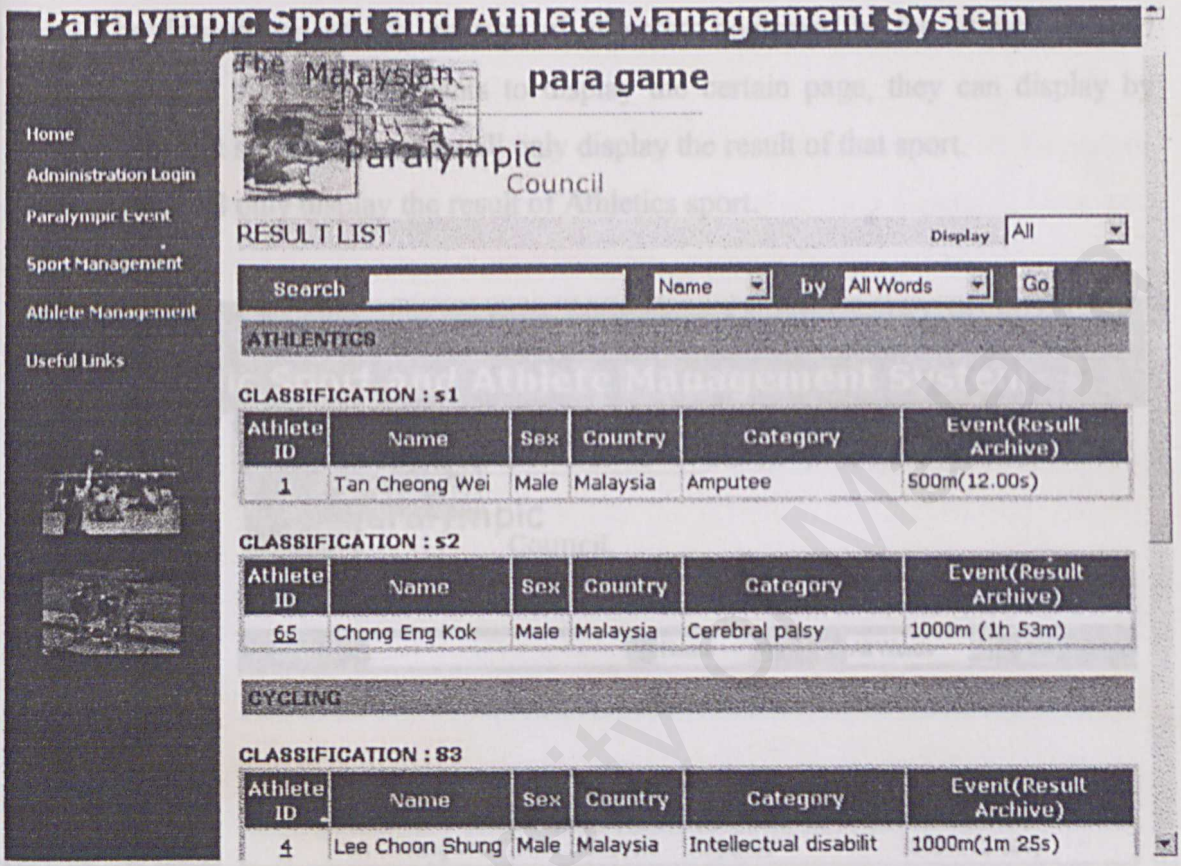

Figure 3.7 List of Result Performance Athlete

1. Figure 3.7 shows the list of the result performance achieves by the athletes in each sport according to the classification.
2. This list is also display the important information only, if the users want to get more detail of each result achieve by the athlete, they can access through click on the *Athlete ID* link. Then the detail will show in the form format.
3. User also allowed search the result by using the search function. Type the keywords and then select the category fields (Athlete ID, Name or Country) by All Words, Any Words or Exact Phrase.

4. The drop down list box at the top of the search bar is enabling the user to display the result according to sport. The result shown in the figure 3.7 is display full list.
5. The drop down list box consists of all sports competed by the Athlete in *Para Game*. If the user just wants to display the certain page, they can display by select that sport and the list will only display the result of that sport.
6. Figure 3.8 only display the result of Athletics sport.

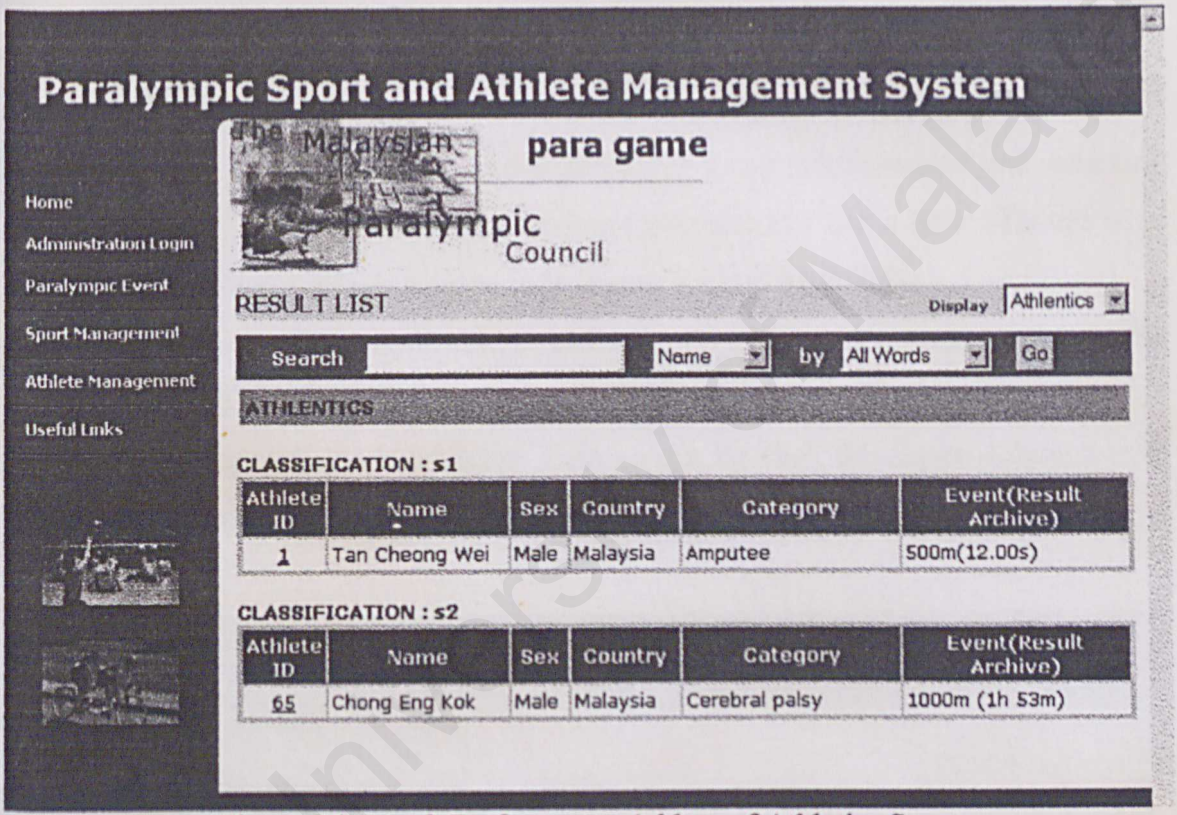

Figure 3.8 Result Performance Athlete of Athletics Sport

7. The figure above shows the result of Athletics Sport only. The other result of sport will not show in the page after the certain sport is selected.
8. After user had selected the certain sport to display, if the user want to search the information, search engine only search the information on that selected sport only, other sport information will not display although the search keywords is

match. (For example, the search keyword matches with other sport information also, but the system only display the Athletics Sport information only).

3.6 Other Function of User Module

1. The other functions of the user module such as Game Village, Arrival & Departure by team or individual is similar to the previously discussed function. Uses can operate the other function by the guidance of the previously discussion.

PART IV USING ADMINISTRATION MODULE

4.1 Starting PAMS

1. Open the web browser, which is Internet Explorer.
2. Then type the address of the Main Page which is same as the starting of PAMS for User Module.
3. After that the main page screen will displayed (Figure 3.1)

4.2 Login

1. The administrator required login before access to administrator page.
2. This system has two types of administrator – super administrator and assistant administrator. The login screen for assistant administrator has a little different with super administrator, which is show in the figure 4.1 and figure 4.2.
3. Super administrator is responsible to create a new game and register new assistant administrator.
4. Go to the page super administrator login screen by click the *Super Administrator Login* link at the bottom of the main page (figure 3.1)

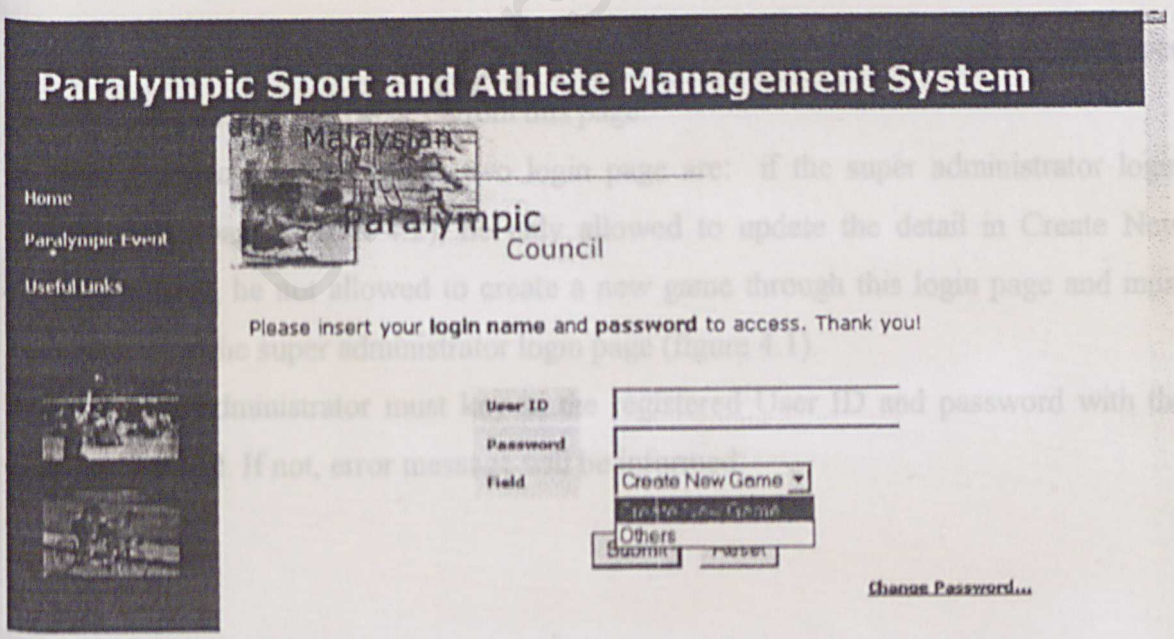

Figure 4.1 Screen login for create new game and register new assistant administrator

5. Figure 4.1 is a super administrator login page for create a new game and register new assistant administrator.
6. Then login the page with the User ID = Superadmin and currently password=123456

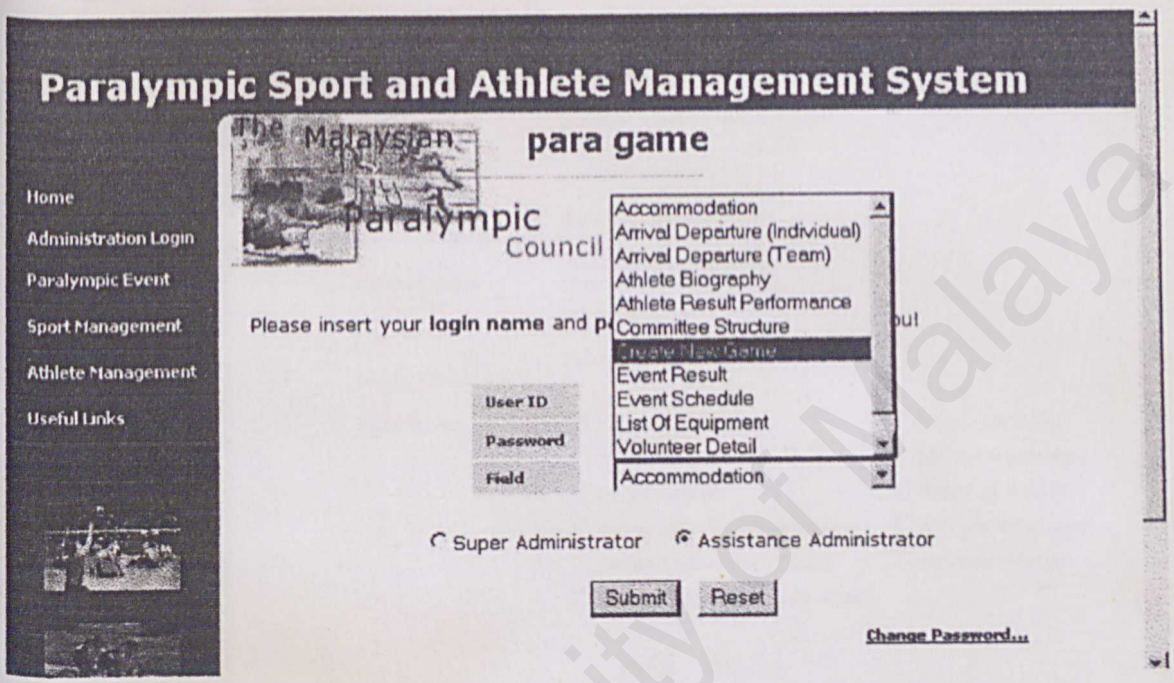

Figure 4.2 Login screen for all of the fields

7. Figure 4.2 is the login page for the assistant administrator but the super administrator can also access from this page.
8. The different between these two login page are: if the super administrator login from this page (figure 4.2), he only allowed to update the detail in Create New Game field, he not allowed to create a new game through this login page and must login from the super administrator login page (figure 4.1).
9. Assistant administrator must key in the registered User ID and password with the correct field. If not, error message will be informed.

If wants to update the assistant administrator detail, click on the User ID , and the detail will show on the form format, then changes the assistant detail and update again.

6. If want delete the assistant administrator detail, click the *Delete* link , the detail will remove from the list.
7. After finishing the registration, click the *Logout* link from the left menu.

4.3 Registration

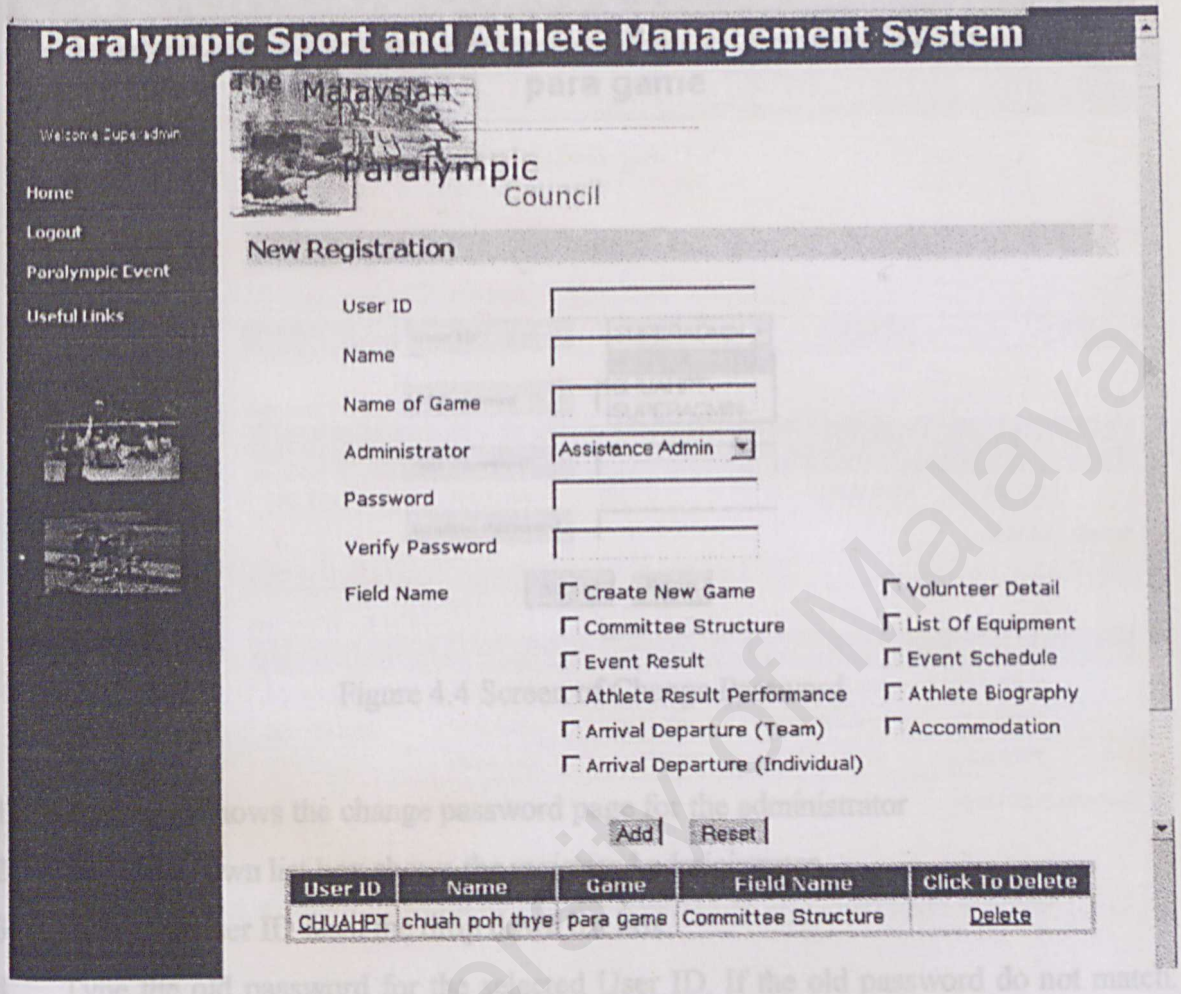

Figure 4.3 Screen of Registration

1. Figure 4.3 show the registration form for register new assistant administrator.
2. Super administrator should login from the login page.
3. Key in the detail of new assistant administrator and check the filed which is allowed to access by the assistant administrator.
4. Then, submit this form by click on the add button.
5. The added detail will display in the table at the bottom of the registration form.

4.4 Change Password

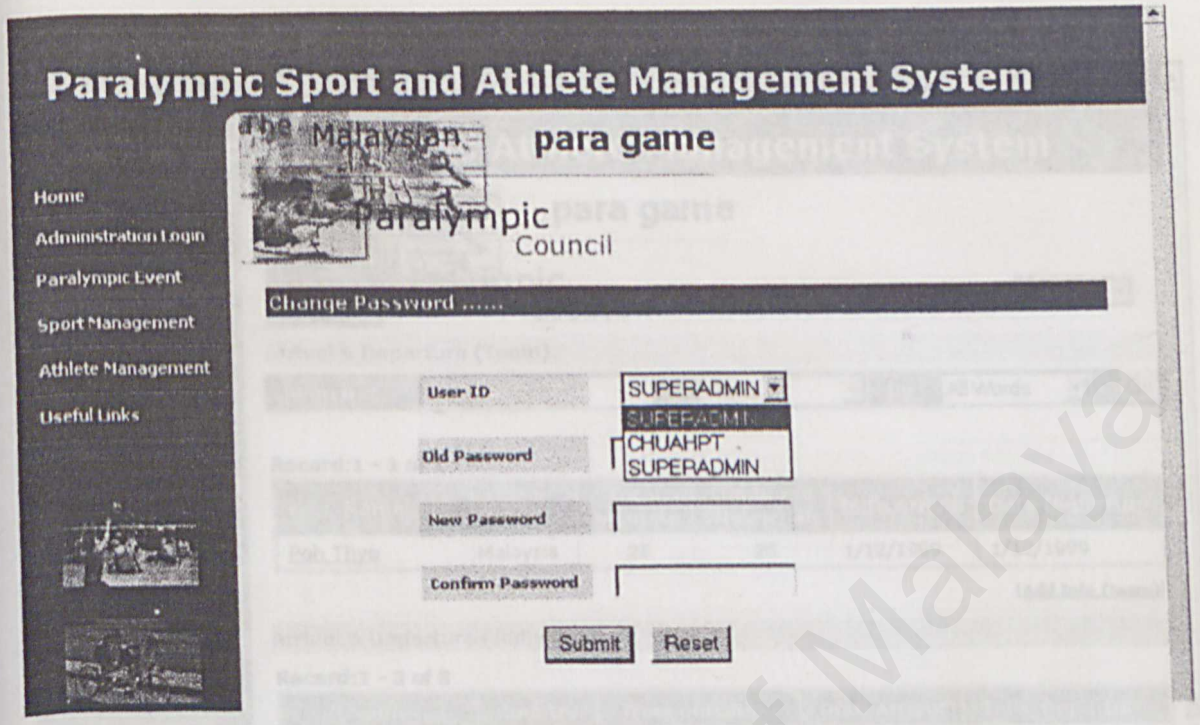

Figure 4.4 Screen of Change Password

1. Figure 4.4 shows the change password page for the administrator
2. The drop down list box shows the registered administrator.
3. Select the user ID from the drop down list box.
4. Type the old password for the selected User ID. If the old password do not match. The system will ask you to key in again.
5. Type the new password into the New Password field and type again the new password to the Confirm password field. The password must at least 6 characters.
6. If the new password does not match the Confirm password or the new password is less than 6 characters, system will prompt out the error message.
7. After finished change the password, click the submit button. Then login with the new password.

4.5 Arrival & Departure (Team or Individual)

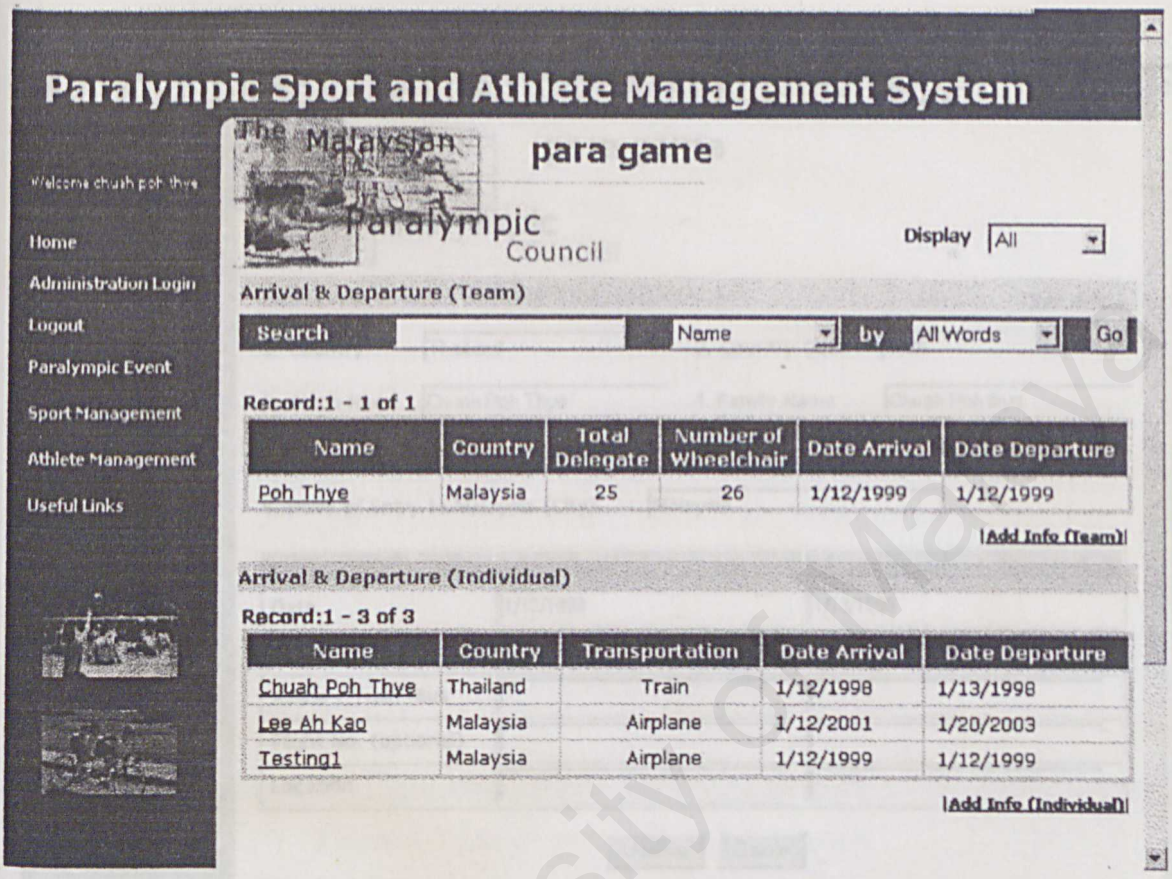

Figure 4.5 Arrival and departure information of administration module

1. Figure 4.5 shows the list of arrival and departure information of *Para Game*.
2. *Add info (individual) or Add info (team)* link only shown after assistant had successfully login to the page. This link provide for the assistant administrator to add new arrival and departure information to the list. The mandatory field must fill in before add the detail to the list. The mandatory field can be check by mouse over the **mandatory field* which is shown on the bottom of table in figure 4.6
3. After added the information to the list, if the administrator want to changes the detail of the arrival and departure delegate, click on the *Name* link. The arrival and

departure detail of delegate will shown in the form, the changes can be made and update again by click on the update button as shown in below:

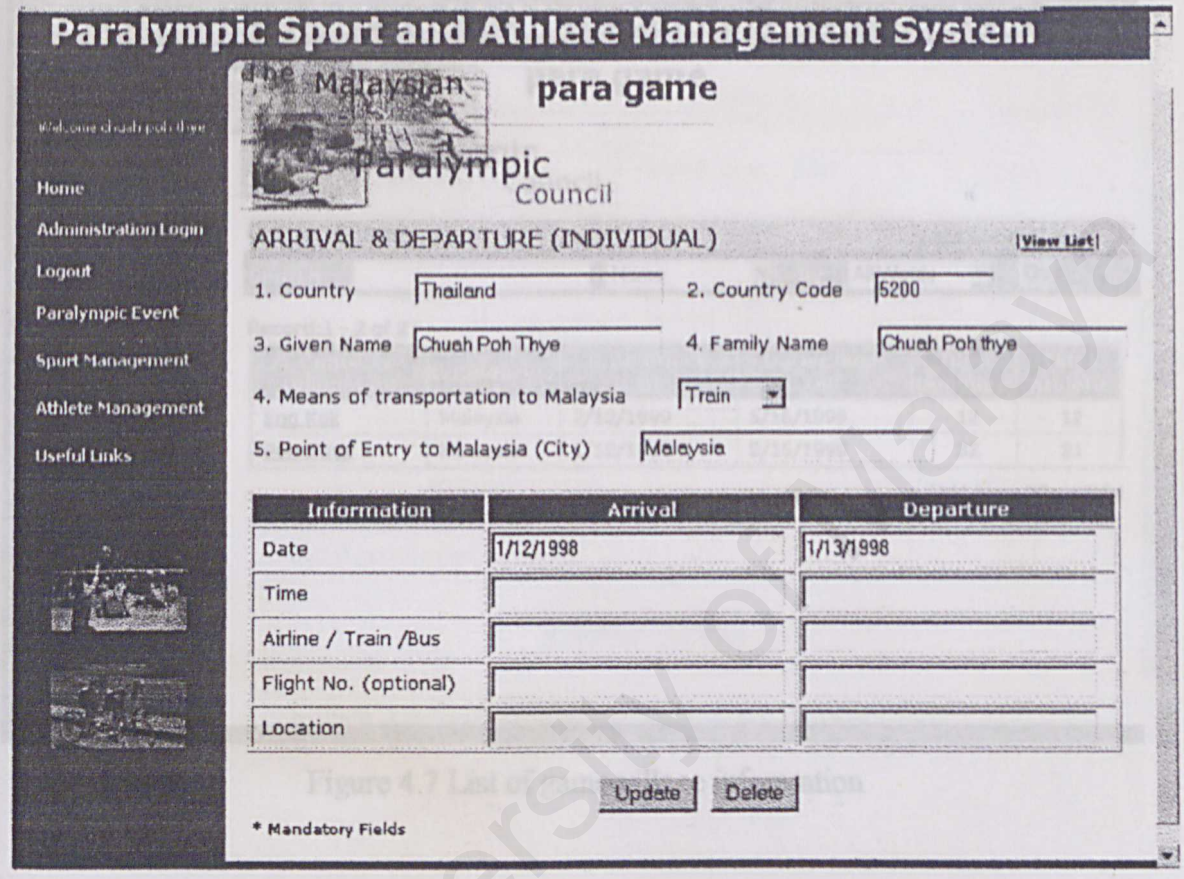

Figure 4.6 Screen of entry arrival and departure (individual) form

4. If want delete the information from the list, just click on the delete button. The detail will remove from list.
5. Administrator also can search the result by using the search engine which is similar with the method search in user module.
6. Administrator can choose the display method by display the full list, display only the arrival & departure (Team) list or only the arrival & departure (Individual) list.

4.6 Game Village

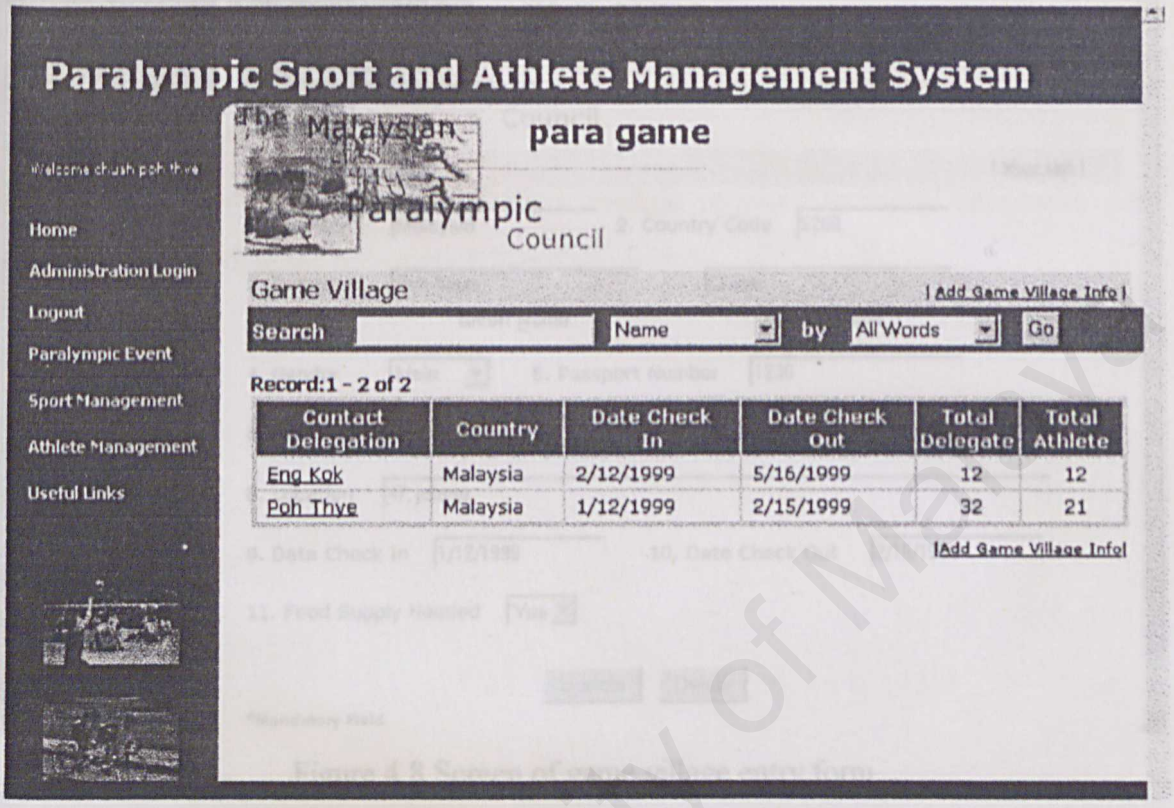

Figure 4.7 List of game village information

1. Figure 4.7 shows the list of accommodation information of the delegate and athlete.
2. The link *Add Game Village Info* provides for the assistant administrator to add new information to the list.
3. This link only display after the assistant administrator had successfully login otherwise it will not be seen.
4. Information about the accommodation can also be updated by click on the *Contact Delegation* link. The existing data will display in the form which is shown in figure 4.8.
5. The update button provide for the administrator to update the changes information and the delete button for the administrator to delete the information from the list.

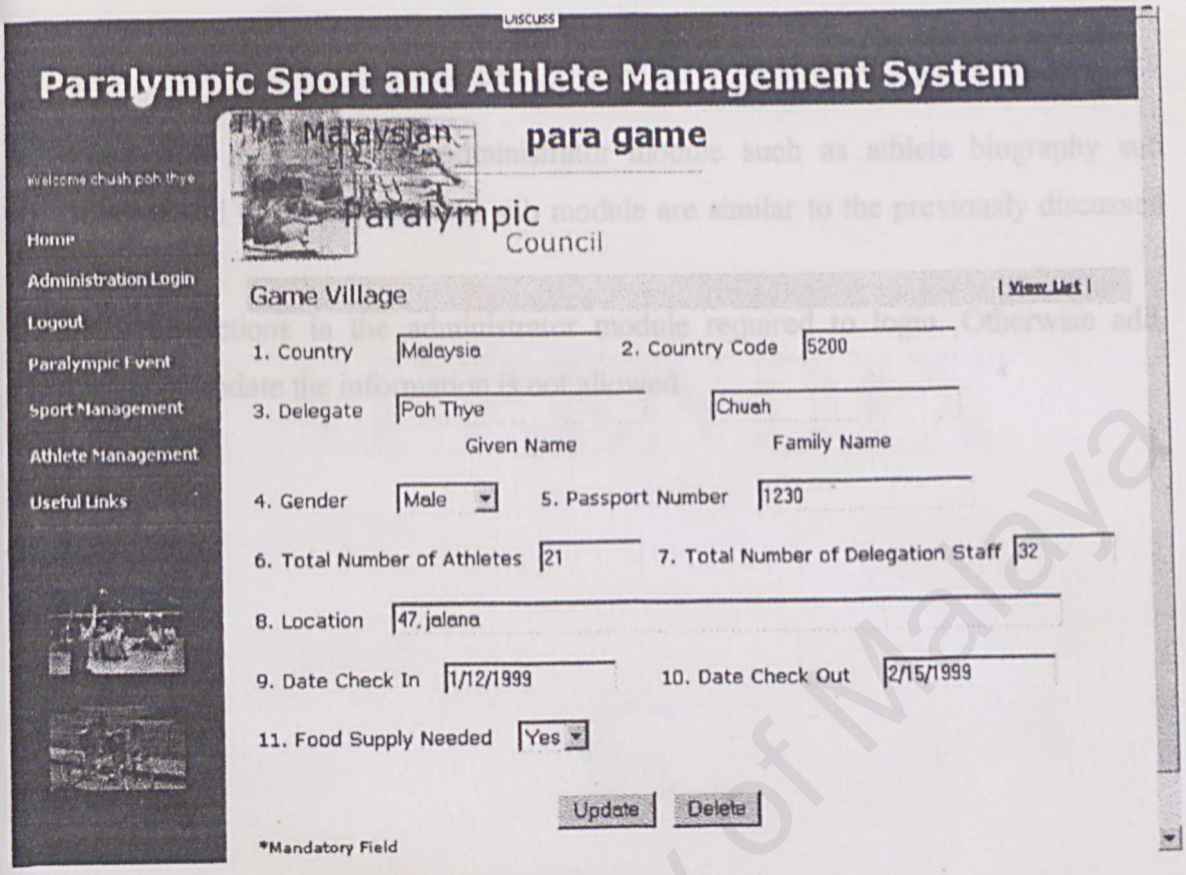

Figure 4.8 Screen of game village entry form

APPENDIX

C

Asean Solidarity
Towards Equality in Sports and in Life

Attach Current Photo of Applicant Write Name at the Back

FORM I

ATHLETE
Biography Form
1st Asean Para Games

Thank you for taking the time to complete this form. By completing this form, you will be ensuring the accuracy and validity of your biography, which will be used for the media. Please use a ballpoint pen and please print in BLOCK LETTERS. In some cases you need to tick the relevant boxes.

A PERSONAL DETAILS

1. Preferred Family Name
2. Preferred Given Name
3. Country for which you are competing (host)

4. Gender ☐ Male ☐ Female

6. Please list the sport you compete (Tick one)

Athletics ☐ Swimming ☐

7. Place of Birth
city/town | state/province | country

8. Disability category
☐ amputee ☐ cerebral palsy ☐ intellectual disability
☐ les autres (other) ☐ visually impaired ☐ wheelchair

9. Do you compete in a wheelchair? Yes ☐ No ☐

10. Occupation/profession
11. Marital Status

B. MAJOR ACHIEVEMENTS

1. Have you represented your country in other international games? If so, please specify which Games, the sport, the event (including classification) and the result.

2. Are you a world/Paralympic/Fespic/national games record holder for any event(s)? If so, please state which event(s) (including classification) the record time/distance/height/weight, and when and where the record was set.

_____

_____

_____

_____

_____

_____

3. Please list your personal best performances for each event

_____

4. Please list any other sporting results, achievements, awards or honours which you would like presented on your 1st Asean Para Games biography.

_____

_____

C. GENERAL INTEREST

1. How and why did you become involved in sport?

_____

2. What are your hobbies/interests?

_____

3. Please list any personal sponsors.

_____

Note: Please send us two (2) passport size photographs of yourself for administration purposes.

THIS FORM SHOULD BE RETURNED TO THE ORGANISING COMMITTEE OF 1ST ASEAN PARA GAMES NOT LATER THAN 25 SEPTEMBER 2001

Asean Solidarity
Towards Equality in Sports and in Life

FORM B
ATHLETICS

ASEAN
A GAMES
LUMPUR 2001

ENTRY FORM – ATHLETE

1ST ASEAN PARA GAMES
25 – 30 OCTOBER 2001, KUALA LUMPUR
(Please print or type)

Please answer all questions

COUNTRY _____ **COUNTRY CODE** _____

_____ _____
Given Name **Family Name**

Date of Birth _____ **Sex** **Male** ☐ **Female** ☐
Day Month Year

Passport Number _____ **Issuing Country** _____

Sport classification _____

Disability category

☐ **amputee** ☐ **cerebral palsy** ☐ **intellectual disability**

☐ **les autres (others)** ☐ **visually impaired** ☐ **wheelchair**

Do you compete in a wheelchair? **Yes** ☐ **No** ☐

Event(s) in Priority Order

1.	4.
2.	5.
3.	6.

DECLARATION AND INDEMNITY CLAUSE

I declare that the information and particulars given above are accurate and correct to the best of my knowledge

I confirm that I am participating in this 1st Asean Para Games on my own free will and that I shall not hold the Organizers responsible for any injury or any loss whatsoever in connection with this Games

_____ _____ _____
Printed Name of Authorize Person **Signature of Authorized Person** **Date**

Note: Please send us two (2) Passport Size photographs of yourself for accreditation purposes.

THIS FORM SHOULD BE RETURNED TO THE ORGANISING COMMITTEE OF 1ST ASEAN PARA GAMES NOT LATER THAN 25 SEPTEMBER 2001

Asean Solidarity
Towards Equality in Sports and in Life

ASEAN PARA GAMES
KUALA LUMPUR 2001

FORM C
SWIMMING

ENTRY FORM – ATHLETE

1ST ASEAN PARA GAMES
25 – 30 OCTOBER 2001, KUALA LUMPUR
(Please print or type)

Please answer all questions:

COUNTRY _____ **COUNTRY CODE** _____

_____ _____
Given Name **Family Name**

Date of Birth _____ **Sex** **Male** ☐ **Female** ☐
Day Month Year

Passport Number _____ **Issuing Country** _____

Sports classification _____

Disability category

☐ **amputee** ☐ **cerebral palsy** ☐ **intellectual disability**
☐ **les autres (others)** ☐ **visually impaired** ☐ **wheelchair**

Do you compete in a wheelchair? **Yes** ☐ **No** ☐

Event(s) in Priority Order

1.	5.	9.
2.	6.	10.
3.	7.	11.
4	8.	12.

DECLARATION AND INDEMNITY CLAUSE

I declare that the information and particulars given above are accurate and correct to the best of my knowledge

I confirm that I am participating in this 1st Asean Para Games on my own free will and that I shall not hold the Organizers responsible for any injury or any loss whatsoever in connection with this Games

_____ _____ _____
Printed Name of Authorized Person **Signature of Authorized Person** **Date**

Note: Please send us two (2) Passport Size photographs of yourself for accreditation purposes.

THIS FORM SHOULD BE RETURNED TO THE ORGANISING COMMITTEE OF 1ST ASEAN PARA GAMES NOT LATER THAN 25 SEPTEMBER 2001

Asean Solidarity
Towards Equality in Sports and in Life

SEAN GAMES
UALA LUMPUR 2001

FORM E

ARRIVAL/DEPARTURE (TEAM)

1ST ASEAN PARA GAMES

25 – 30 OCTOBER 2001, KUALA LUMPUR

(Please print or type)

COUNTRY _____ **COUNTRY CODE** _____

Please answer all questions:

If arriving as a delegation, please complete the following information

Delegation Contact _____ _____

Given Name **Family Name**

Total of Delegation _____ **No. of Wheelchair users** _____ **No. of blind** _____

Means of transportation to Malaysia (tick one) ☐ **Airplane** ☐ **Train** ☐ **Bus**

Point of Entry to Malaysia (City) _____

Information	Arrival	Departure
Date		
Time		
Airline/Train/Bus		
Flight No.		

_____ _____ _____

Printed Name of Authorized Person **Signature of Authorized Person** **Date**

THIS FORM SHOULD BE RETURNED TO THE ORGANIZING COMMITTEE OF 1ST ASEAN PARA GAMES NOT LATER THAN 25 SEPTEMBER 2001

Asean Solidarity
Towards Equality in Sports and in Life

FORM F

ASEAN GAMES
LUMPUR 2001

ARRIVAL/DEPARTURE (INDIVIDUAL)

1ST ASEAN PARA GAMES
25 – 30 OCTOBER 2001, KUALA LUMPUR
(Please print or type)

COUNTRY _____ **COUNTRY CODE** _____

Please complete the following information:

Name:

_____ _____
Given Name **Family Name**

Means of transportation to Malaysia (tick one) ☐ **Airplane** ☐ **Train** ☐ **Bus**

Point of Entry to Malaysia (City) _____

Information	Arrival	Departure
Date		
Time		
Airline/Train/Bus		
Flight No.		

_____ _____ _____
Printed Name of Authorized Person **Signature of Authorized Person** **Date**

THIS FORM SHOULD BE RETURNED TO THE ORGANIZING COMMITTEE OF 1ST ASEAN PARA GAMES NOT LATER THAN 25 SEPTEMBER 2001